

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE <div style="text-align: center;">J</div>		PAGE OF PAGES <div style="text-align: center;">1 1</div>	
2. AMENDMENT/MODIFICATION NO. 0003		3. EFFECTIVE DATE 25-Nov-2005		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)
6. ISSUED BY NAVAL SURFACE WARFARE CENTER, CARDEROCK CODE 3351, ELIZABETH J. YOUSE 5001 SOUTH BROAD ST. PHILADELPHIA PA 19112-1403		CODE N65540		7. ADMINISTERED BY (If other than item 6) <div style="text-align: center; font-weight: bold;">See Item 6</div>		CODE
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				X 9A. AMENDMENT OF SOLICITATION NO. N65540-05-R-0029		
				X 9B. DATED (SEE ITEM 11) 02-Nov-2005		
				10A. MOD. OF CONTRACT/ORDER NO.		
				10B. DATED (SEE ITEM 13)		
CODE		FACILITY CODE				
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS						
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended.						
Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.						
12. ACCOUNTING AND APPROPRIATION DATA (If required)						
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.						
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.						
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).						
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
D. OTHER (Specify type of modification and authority)						
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.						
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)						
The Modification makes the following amendments to the Solicitation: (1) The ordering period for the proposed contract is increased from four years to five years (change reflected in Notes to Section B and in Clause 52.216-8 included in Section I); (2) The scope of this procurement is expanded from MCS components required by NSWCCD-NAVSES Code 916 during the contract period for CVN-68 class ships to MCS components required by NSWCCD-NAVSES Code 916 during the contract period for U.S. Navy ships (change reflected in the following parts of the Procurement Specification included as Section C: 1.1, 1.6, 2.1, 2.9, 7.1, and 8.0); (3) Schedule B has been revised to reflect the higher number of estimates for components and to add SLINs relating to proposed contract year five; (4) The following clauses have been added in Section F: 52.211-9 (in full) and 52.211-17 (by reference); (5) the closing date specified in Block 9 has been changed. A conformed copy of the Solicitation including all changes is attached.						
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.						
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
				TEL: _____ EMAIL: _____		
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED
_____ (Signature of person authorized to sign)				BY _____ (Signature of Contracting Officer)		

SOLICITATION, OFFER AND AWARD			1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)		RATING A3	PAGE 1	OF 1	PAGES 125	
2. CONTRACT NO.		3. SOLICITATION NO. N65540-05-R-0029		4. TYPE OF SOLICITATION [] SEALED BID (IFB) [X] NEGOTIATED (RFP)	5. DATE ISSUED 02 Nov 2005		6. REQUISITION/PURCHASE NO.		
7. ISSUED BY NAVAL SURFACE WARFARE CENTER, CARDEROCK CODE 3351, ELIZABETH J. YOUSE 5001 SOUTH BROAD ST. PHILADELPHIA PA 19112-1403 TEL: 215-897-7768 FAX: 215-897-7902				8. ADDRESS OFFER TO See Item 7		(If other than Item 7) CODE TEL: FAX:			
NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".									
SOLICITATION									
9. Sealed offers in original and <u>4</u> copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in _____ until <u>11:00 AM</u> local time <u>22 Dec 2005</u> (Hour) (Date)									
CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in this solicitation.									
10. FOR INFORMATION CALL:		A. NAME ELIZABETH J. YOUSE		B. TELEPHONE (Include area code) (NO COLLECT CALLS) 215-897-7768		C. E-MAIL ADDRESS elizabeth.youse@navy.mil			
11. TABLE OF CONTENTS									
(X)	SEC.	DESCRIPTION		PAGE(S)	(X)	SEC.	DESCRIPTION		
PART I - THE SCHEDULE					PART II - CONTRACT CLAUSES				
	A	SOLICITATION/ CONTRACT FORM				I	CONTRACT CLAUSES		
	B	SUPPLIES OR SERVICES AND PRICES/ COSTS			PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS				
	C	DESCRIPTION/ SPECS./ WORK STATEMENT				J	LIST OF ATTACHMENTS		
	D	PACKAGING AND MARKING			PART IV - REPRESENTATIONS AND INSTRUCTIONS				
	E	INSPECTION AND ACCEPTANCE				K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS		
	F	DELIVERIES OR PERFORMANCE				L	INSTRS., CONDS., AND NOTICES TO OFFERORS		
	G	CONTRACT ADMINISTRATION DATA				M	EVALUATION FACTORS FOR AWARD		
	H	SPECIAL CONTRACT REQUIREMENTS							
OFFER (Must be fully completed by offeror)									
NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.									
12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.									
13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52.232-8)									
14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated):				AMENDMENT NO.		DATE		AMENDMENT NO.	
15A. NAME AND ADDRESS OF OFFEROR		CODE		FACILITY		16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)			
15B. TELEPHONE NO (Include area code)		15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE. <input type="checkbox"/>				17. SIGNATURE		18. OFFER DATE	
AWARD (To be completed by Government)									
19. ACCEPTED AS TO ITEMS NUMBERED				20. AMOUNT		21. ACCOUNTING AND APPROPRIATION			
22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c)() <input type="checkbox"/> 41 U.S.C. 253(c)()						23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)		ITEM	
24. ADMINISTERED BY (If other than Item 7)				CODE		25. PAYMENT WILL BE MADE BY		CODE	
26. NAME OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:						27. UNITED STATES OF AMERICA (Signature of Contracting Officer)		28. AWARD DATE	
IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.									

Section B - SCHEDULE OF SUPPLIES

0001 Basic Input/Output (I/O) Enclosures, without modules, ordered during the first year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AA	24x24x8 Submersible I/O Enclosure	16	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AB	24x24x8 I/O enclosure, drip-proof, removable cover	6	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AC	24x24x8 I/O Enclosure, drip-proof, hinged cover	24	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AD	24x24x10 I/O Enclosure, drip-proof, removable cover	1	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AE	24x24x10 I/O Enclosure, drip-proof, hinged cover	68	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AF	30x36x8 I/O Enclosure, drip-proof, hinged cover	4	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0001AG	Rack mounted I/O Buckets	20	Each	\$ _____	\$ _____

0002 I/O Modules Installed, with Harness, ordered during the first year after date of award

ITEM NO	SUPPLIES SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AA	Ethernet Communications Module	158	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AB	PLC Module	26	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AC	PM Module	130	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AD	I/O Module Installed with Harness Type IAN	176	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AE	I/O Module Installed with Harness Type IAI	50	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AF	I/O Module Installed with Harness Type ISN	78	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AG	I/O Module Installed with Harness Type IDN	20	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AH	I/O Module Installed with Harness Type QAN	96	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AJ		20	Each	\$_____	\$_____
	I/O Module Installed with Harness Type QKW				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AK		6	Each	\$_____	\$_____
	I/O Module Installed with Harness Type QKX				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AL		8	Each	\$_____	\$_____
	I/O Module Installed with Harness Type QK6				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AM		28	Each	\$_____	\$_____
	I/O Module Installed with Harness Type QDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AN		40	Each	\$_____	\$_____
	I/O Module Installed with Harness Type QDN32				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AP		58	Each	\$_____	\$_____
	I/O Module Installed with Harness Type AR3				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AQ		52	Each	\$_____	\$_____
	I/O Module Installed with Harness Type ACN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AR		6	Each	\$_____	\$_____
	I/O Module Installed with Harness Type AOC				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AS		4	Each	\$_____	\$_____
	I/O Module Installed with Harness Type AVN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0002AT	I/O Module Installed with Harness Type QANM	4	Each	\$_____	\$_____

0003 Uninstalled spare I/O Modules, with harness, ordered during the first year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AA	Spare Ethernet Communications Module, Uninstalled	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AB	Spare PLC Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AC	Spare PM Module, Uninstalled	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AD	Spare I/O Module, Uninstalled, with Harness Type IAN	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AE	Spare I/O Module, Uninstalled, with Harness Type IAI	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AF	Spare I/O Module, Uninstalled, with Harness Type ISN	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AG	Spare I/O Module, Uninstalled, with Harness Type IDN	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AH		15	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type QAN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AJ		5	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type QKW				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AK		2	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type QKX				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AL		2	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type QK6				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AM		5	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type QDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AN		10	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type QDN32				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AP		10	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type AR3				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AQ		10	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type ACN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AR		2	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, with Harness Type AOC				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AS	Spare I/O Module, Uninstalled, with Harness Type AVN	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0003AT	Spare I/O Module, Uninstalled, with Harness Type QANM	2	Each	\$_____	\$_____

0004 Basic Industrial Ethernet (IE) Enclosures, without modules, ordered during the first year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0004AA	16x16x10 IE Enclosure, drip -proof, hinged cover	16	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0004AB	16x16x10 IE Enclosure, submersible	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0004AC	24x24x10 IE Enclosure, drip -proof, hinged cover	6	Each	\$_____	\$_____

0005 Industrial Ethernet (IE) Modules, Installed, ordered during the first year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0005AA	2 Slot IE Module, Installed	12	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0005AB	4 Slot IE Module, Installed	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0005AC	6 Slot IE Module, Installed	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0005AD	4_Cat5 IE Module, Installed	34	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0005AE	2_Cat5/2_FO IE Module, Installed	48	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0005AF	4_FO IE Module, Installed	6	Each	\$_____	\$_____

0006 Uninstalled Spare IE Modules, ordered during the first year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0006AA	Spare 2 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0006AB	Spare 4 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0006AC	Spare 6 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0006AD	Spare 4_Cat5 IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0006AE	Spare 2_Cat5/2_FO IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0006AF	Spare 4_FO IE Module, Uninstalled	2	Each	\$_____	\$_____

0007 Basic Input/Output (I/O) Enclosures, without modules, ordered during the second year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AA	24x24x8 Submersible (SUB) I/O Enclosure	16	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AB	24x24x8 I/O Enclosure, drip-proof, removable cover	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AC	24x24x8 I/O Enclosure, drip-proof, hinged cover	24	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AD	24x24x10 I/O Enclosure, drip-proof, removable cover	1	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AE	24x24x10 I/O Enclosure, drip-proof, hinged cover	68	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AF	30x36x8 I/O Enclosure, drip-proof, hinged cover	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0007AG	Rack mounted I/O Buckets FOB: Destination	20	Each	\$_____	\$_____

**0008 I/O Modules Installed, with Harness, ordered during the second year
after date of award**

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AA	Ethernet Communications Module	158	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AB	PLC Module	26	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AC	PM Module	130	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AD	I/O Module Installed with Harness Type IAN	176	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AE	I/O Module Installed with Harness Type IAI	50	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AF	I/O Module Installed with Harness Type ISN	78	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AG	I/O Module Installed with Harness Type IDN	20	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AH	I/O Module Installed with Harness Type QAN	96	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AJ	I/O Module Installed with Harness Type QKW	20	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AK	I/O Module Installed with Harness Type QKX	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AL	I/O Module Installed with Harness Type QK6	8	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AM	I/O Module Installed with Harness Type QDN	28	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AN	I/O Module Installed with Harness Type QDN32	40	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AP	I/O Module Installed with Harness Type AR3	58	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AQ	I/O Module Installed with Harness Type ACN	52	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AR	I/O Module Installed with Harness Type AOC	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AS	I/O Module Installed with Harness Type AVN	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0008AT	I/O Module Installed with Harness Type QANM	4	Each	\$_____	\$_____

0009 Uninstalled Spare I/O Modules, with harness, ordered during the second year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AA	Spare Ethernet Communications Module, Uninstalled	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AB	Spare PLC Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AC	Spare PM Module, Uninstalled	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AD	Spare I/O Module, Uninstalled, with Harness Type IAN	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AE	Spare I/O Module, Uninstalled, with Harness Type IAI	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AF	Spare I/O Module, Uninstalled, with Harness Type ISN	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AG		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type IDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AH		15	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QAN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AJ		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QKW				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AK		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QKX				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AL		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QK6				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AM		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AN		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QDN32				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AP		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type AR3				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AQ		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type ACN				

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AR		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type AOC				

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AS		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type AVN				

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0009AT		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QANM				

0010 Basic Industrial Ethernet (IE) Enclosures, without modules, ordered during the second year after date of award

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0010AA		16	Each	\$_____	\$_____
	16x16x10 IE Enclosure, drip-proof, hinged cover				

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0010AB		2	Each	\$_____	\$_____
	16x16x10 IE Enclosure, submersible				

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0010AC		6	Each	\$_____	\$_____
	24x24x10 IE Enclosure, drip-proof, hinged cover				

0011 Industrial Ethernet (IE) Modules, Installed, ordered during the second year after date of award

ITEM NO	SUPPLIES/SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0011AA		12	Each	\$_____	\$_____
	2 Slot IE Module, Installed				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0011AB	4 Slot IE Module, Installed	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0011AC	6 Slot IE Module, Installed	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0011AD	4_Cat5 IE Module, Installed	34	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0011AE	2_Cat5/2_FO IE Module, Installed	48	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0011AF	4_FO IE Module, Installed	6	Each	\$_____	\$_____

0012 Uninstalled Spare IE Modules, ordered during the second year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0012AA	Spare 2 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0012AB	Spare 4 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0012AC	Spare 6 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0012AD	Spare 4_Cat5 IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0012AE	Spare 2_Cat5/2_FO IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0012AF	Spare 4_FO IE Module, Uninstalled	2	Each	\$_____	\$_____

0013 Basic Input/Output (I/O) Enclosures, without modules, ordered during the third year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AA	24x24x8 Submersible (SUB) I/O Enclosure	16	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AB	24x24x8 I/O Enclosure, drip-proof, removable cover	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AC	24x24x8 I/O Enclosure, drip-proof, hinged cover	24	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AD	24x24x10 I/O Enclosure, drip-proof, removable cover	1	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AE	24x24x10 D-H I/O Enclosure, drip-proof, hinged cover	68	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AF	30x36x8 I/O Enclosure, drip-proof, hinged cover	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0013AG	Rack mounted I/O Buckets	20	Each	\$_____	\$_____

0014 I/O Modules Installed, with Harness, ordered during the third year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AA	Ethernet Communications Module	158	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AB	PLC Module	26	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AC	PM	130	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AD	I/O Module Installed with Harness Type IAN	176	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AE	I/O Module Installed with Harness Type IAI	50	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AF	I/O Module Installed with Harness Type ISN	78	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AG	I/O Module Installed with Harness Type IDN	20	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AH	I/O Module Installed with Harness Type QAN	96	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AJ	I/O Module Installed with Harness Type QKW	20	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AK	I/O Module Installed with Harness Type QKX	6	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AL	I/O Module Installed with Harness Type QK6	8	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AM	I/O Module Installed with Harness Type QDN	28	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AN	I/O Module Installed with Harness Type QDN32	40	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AP	I/O Module Installed with Harness Type AR3	58	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AQ	I/O Module Installed with Harness Type ACN FOB: Destination	52	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AR	I/O Module Installed with Harness Type AOC	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AS	I/O Module Installed with Harness Type AVN	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0014AT	I/O Module Installed with Hamess Type QANM FOB: Destination	4	Each	\$_____	\$_____

0015 Uninstalled Spare I/O Modules, with Harness, ordered during the third year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AA	Spare ENET Module, Uninstalled	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AB	Spare PLC Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AC	Spare PM Module, Uninstalled	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AD	Spare I/O Module, Uninstalled, with Harness Type IAN	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AE	Spare I/O Module, Uninstalled, with Harness Type IAI	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AF		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type ISN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AG		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type IDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AH		15	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QAN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AJ		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QKW				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AK		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QKX				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AL		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QK6				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AM		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AN		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QDN32				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AP		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type AR3				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AQ		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type ACN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AR		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type AOC				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AS		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type AVN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0015AT		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, with Harness Type QANM				

0016 Basic Industrial Ethernet (IE) Enclosures, without modules, ordered during the third year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0016AA		16	Each	\$_____	\$_____
	16x16x10 IE Enclosure, drip-proof, hinged cover				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0016AB		2	Each	\$_____	\$_____
	16x16x10 IE Enclosure, Submersible				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0016AC		6	Each	\$_____	\$_____
	24x24x10 IE Enclosure, drip-proof, hinged cover				

0017 Industrial Ethernet (IE) Modules, Installed, ordered during the third year after award date

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0017AA		12	Each	\$_____	\$_____
	2 Slot IE Module, Installed				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0017AB	4 Slot IE Module, Installed	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0017AC	6 Slot IE Module, Installed	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0017AD	4_Cat5 IE Module, Installed	34	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0017AE	2_Cat5/2_FO IE Module, Installed	48	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0017AF	4_FO IE Module, Installed	6	Each	\$_____	\$_____

0018 Uninstalled Spare IE Modules, ordered during the third year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0018AA	Spare 2 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0018AB	Spare 4 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0018AC	Spare 6 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0018AD	Spare 4_Cat5 IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0018AE	Spare 2_Cat5/2_FO IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0018AF	Spare 4_FO IE Module, Uninstalled	2	Each	\$_____	\$_____

0019 Basic Input/Output (I/O) Enclosures, without Modules, ordered during the fourth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AA	24x24x8 Submersible I/O Enclosure	16	Each		

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AB	24x24x8 I/O Enclosure, drip proof, removable cover	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AC	24x24x8 I/O Enclosure, drip-proof, hinged cover	24	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AD	24x24x10 I/O Enclosure, drip-proof, removable cover	1	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AE	24x24x10 I/O Enclosure, drip-proof, hinged cover	68	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AF	30x36x8 I/O Enclosure, drip-proof, hinged cover	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0019AG	Rack mounted I/O Buckets	20	Each	\$_____	\$_____

0020 I/O Modules Installed, with Harness, ordered during fourth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AA	Ethernet Communications Module	158	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AB	PLC Module	26	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AC	PM Module	130	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AD	I/O Module, Installed, with Harness Type IAN	176	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AE	I/O Module, Installed, with Harness Type IAI	50	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AF	I/O Module, Installed, with Harness Type ISN	78	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AG	I/O Module, Installed, with Harness Type IDN	20	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AH	I/O Module, Installed, with Harness Type QAN	96	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AJ	I/O Module, Installed, with Harness Type QKW	20	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AK	I/O Module, Installed, with Harness Type QKX	6	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AL	I/O Module, Installed, with Harness Type QK6	8	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AM	I/O Module, Installed, with Harness Type QDN	28	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AN	I/O Module, Installed, with Harness Type QDN32	40	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AP	I/O Module, Installed, with Harness Type AR3	58	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AQ	I/O Module, Installed, with Harness Type ACN	52	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AR	I/O Module, Installed, with Harness Type AOC	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AS	I/O Module, Installed, with Harness Type AVN	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0020AT	I/O Module, Installed, with Harness Type QANM	4	Each	\$_____	\$_____

0021 Uninstalled Spare I/O Modules, with Harness, ordered during fourth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AA	Spare E-Net Module, Uninstalled	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AB	Spare PLC Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AC	Spare PM Module, Uninstalled	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AD	Spare I/O Module, Uninstalled, W/O Harness, Type IAN	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AE	Spare I/O Module, Uninstalled, W/O Harness, Type IAI	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AF		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type ISN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AG		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type IDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AH		15	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type QAN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AJ		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type QKW				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AK		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type QKX				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AL		2	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type QK6				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AM		5	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type QDN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AN		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type QDN32				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AP		10	Each	\$_____	\$_____
	Spare I/O Module, Uninstalled, W/O Harness, Type AR3				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AQ		10	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, W/O Harness, Type ACN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AR		2	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, W/O Harness, Type AOC				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AS		2	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, W/O Harness, Type AVN				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0021AT		2	Each	\$ _____	\$ _____
	Spare I/O Module, Uninstalled, W/O Harness, Type QANM				

0022 Basic Industrial Ethernet (IE) Enclosures, without modules, ordered during the fourth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0022AA		16	Each	\$ _____	\$ _____
	16x16x10 IE Enclosure, drip-proof, hinged cover				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0022AB		2	Each	\$ _____	\$ _____
	16x16x10 IE Enclosure, Submersible				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0022AC		6	Each	\$ _____	\$ _____
	24x24x10 IE Enclosure, drip-proof, hinged cover				

0023 Industrial Ethernet (IE) Modules, Installed, ordered during fourth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0023AA		12	Each	\$ _____	\$ _____
	2 Slot IE Module, Installed				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0023AB	4 Slot IE Module, Installed	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0023AC	6 Slot IE Module, Installed	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0023AD	4_Cat5 IE Module, Installed	34	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0023AE	2_Cat5/2_FO IE Module, Installed	48	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0023AF	4_FO IE Module, Installed	6	Each	\$_____	\$_____

0024 Uninstalled Spare IE Modules, ordered during fourth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0024AA	Spare 2 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0024AB	Spare 4 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0024AC	6 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0024AD	Spare 4_Cat5 IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0024AE	Spare 2_Cat5/2_FO IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0024AF	Spare 4_FO IE Module, Uninstalled	2	Each	\$_____	\$_____

0025 Basic Input/Output (I/O) Enclosures, without modules, ordered during the fifth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AA	24x24x8 Submersible I/O Enclosure	16	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AB	24x24x8 I/O enclosure, drip-proof, removable cover	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AC	24x24x8 I/O Enclosure, drip-proof, hinged cover	24	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AD	24x24x10 I/O Enclosure, drip-proof, removable cover	1	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AE	24x24x10 I/O Enclosure, drip-proof, hinged cover	68	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AF	30x36x8 I/O Enclosure, drip-proof, hinged cover	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0025AG	Rack mounted I/O Buckets	20	Each	\$_____	\$_____

0026 I/O Modules Installed, with Harness, ordered during the fifth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AA	Ethernet Communications Module	158	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AB	PLC Module	26	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AC	PM Module	130	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AD	I/O Module Installed with Harness Type IAN	176	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AE	I/O Module Installed with Harness Type IAI	50	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AF	I/O Module Installed with Harness Type ISN	78	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AG	I/O Module Installed with Harness Type IDN	20	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AH	I/O Module Installed with Harness Type QAN	96	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AJ	I/O Module Installed with Harness Type QKW	20	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AK	I/O Module Installed with Harness Type QKX	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES /SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AL	I/O Module Installed with Harness Type QK6	8	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AM	I/O Module Installed with Harness Type QDN	28	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AN	I/O Module Installed with Harness Type QDN32	40	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AP	I/O Module Installed with Harness Type AR3	58	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AQ	I/O Module Installed with Harness Type ACN	52	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AR	I/O Module Installed with Harness Type AOC	6	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AS	I/O Module Installed with Harness Type AVN	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0026AT	I/O Module Installed with Harness Type QANM	4	Each	\$_____	\$_____

0027 Uninstalled spare I/O Modules, with harness, ordered during the fifth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AA	Spare Ethernet Communications Module, Uninstalled	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AB	Spare PLC Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AC	Spare PM Module, Uninstalled	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AD	Spare I/O Module, Uninstalled, with Harness Type IAN	15	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AE	Spare I/O Module, Uninstalled, with Harness Type IAI	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AF	Spare I/O Module, Uninstalled, with Harness Type ISN	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AG	Spare I/O Module, Uninstalled, with Harness Type IDN	5	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AH	Spare I/O Module, Uninstalled, with Harness Type QAN	15	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AJ	Spare I/O Module, Uninstalled, with Harness Type QKW	5	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AK	Spare I/O Module, Uninstalled, with Harness Type QKX	2	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AL	Spare I/O Module, Uninstalled, with Harness Type QK6	2	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AM	Spare I/O Module, Uninstalled, with Harness Type QDN	5	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AN	Spare I/O Module, Uninstalled, with Harness Type QDN32	10	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AP	Spare I/O Module, Uninstalled, with Harness Type AR3	10	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AQ	Spare I/O Module, Uninstalled, with Harness Type ACN	10	Each	\$ _____	\$ _____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AR	Spare I/O Module, Uninstalled, with Harness Type AOC	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AS	Spare I/O Module, Uninstalled, with Harness Type AVN	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0027AT	Spare I/O Module, Uninstalled, with Harness Type QANM	2	Each	\$_____	\$_____

0028 Basic Industrial Ethernet (IE) Enclosures, without modules, ordered during the fifth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0028AA	16x16x10 IE Enclosure, drip -proof, hinged cover	16	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0028AB	16x16x10 IE Enclosure, submersible	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0028AC	24x24x10 IE Enclosure, drip -proof, hinged cover	6	Each	\$_____	\$_____

0029 Industrial Ethernet (IE) Modules, Installed, ordered during the fifth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0029AA	2 Slot IE Module, Installed	12	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0029AB	4 Slot IE Module, Installed	12	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0029AC	6 Slot IE Module, Installed	10	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0029AD	4_Cat5 IE Module, Installed	4	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0029AE	2_Cat5/2_FO IE Module, Installed	34	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0029AF	4_FO IE Module, Installed	48	Each	\$_____	\$_____

0030 Uninstalled Spare IE Modules, ordered during the fifth year after date of award

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0030AA	Spare 2 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0030AB	Spare 4 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0030AC	Spare 6 Slot IE Module, Uninstalled	2	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0030AD	Spare 4_Cat5 IE Module, Uninstalled	5	Each	\$_____	\$_____

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0030AE		5	Each	\$_____	\$_____
	Spare 2_Cat5/2_FO IE Module, Uninstalled				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0030AF		2	Each	\$_____	\$_____
	Spare 4_FO IE Module, Uninstalled				

0031 Technical Data in Accordance with Form DD1423

0032 Engineering Support Services

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0032AA		550	Labor Hours	\$_____	\$_____
	Engineering Support performed during the first year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0032AB		200	Labor Hours	\$_____	\$_____
	Engineering Support performed during the second year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0032AC		200	Labor Hours	\$_____	\$_____
	Engineering Support performed during the third year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0032AD		200	Labor Hours	\$_____	\$_____
	Engineering Support performed during the fourth year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0032AE		200	Labor Hours	\$_____	\$_____
	Engineering Support performed during the fifth year after date of award				

0033 On-Site Technical Support for CVN MCS

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AA		360	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Regular Time, performed during the first year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AB		120	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Overtime, performed during the first year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AC		120	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Regular Time, performed during the second year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AD		40	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Overtime, performed during the second year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AE		120	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Regular Time, performed during the third year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AF		40	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Overtime, performed during the third year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AG		120	Labor Hours	\$_____	\$_____
	On-Site Tech Support, Regular Time, performed during the fourth year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AH		40	Labor Hours	\$ _____	\$ _____
	On-Site Tech Support, Overtime, performed during the fourth year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AJ		120	Labor Hours	\$ _____	\$ _____
	On-Site Tech Support, Regular Time, performed during the fifth year after date of award				

ITEM NO	SUPPLIES/ SERVICES	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
0033AK		40	Labor Hours	\$ _____	\$ _____
	On-Site Tech Support, Overtime, performed during the fifth year after date of award				

0034 Travel Costs, including per diem

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0034AA	Travel during the first year after date of award	\$13,000.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0034AB	Travel during the second year after date of award	\$5,000.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0034AC	Travel during the third year after date of award	\$5,000.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0034AD	Travel during the fourth year after date of award	\$5,000.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0034AE	Travel during the fifth year after date of award	\$5,000.00

0035 Miscellaneous Materials

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0035AA	Materials, first year after date of award	\$15,000.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0035AB	Materials, second year after date of award	\$7,500.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0035AC	Materials, third year after date of award	\$7,500.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0035AD	Materials, fourth year after date of award	\$7,500.00

ITEM NO	SUPPLIES/ SERVICES	Not To Exceed Amount
0035AE	Materials, fifth year after date of award	\$7,500.00

ADDITIONAL INFORMATION REQUIREMENTS CONTRACT

This Solicitation is intended to result in the award of a firm-fixed-price requirements contract to fulfill the needs of NSWCCD-SSES Code 916 for Machinery Control System components for U.S. Navy ships, and related Engineering Support and On-Site Technical Support, during the five-year period of performance of the contract. The quantities of supplies specified in the Schedule are estimates only and are not purchased through issuance of the contract. If the Government's requirements do not result in orders in the quantities described as "estimated" or "maximum" in the Schedule, that fact shall not constitute the basis for an equitable price adjustment. See Clause 52.216-21 in the Solicitation for further information.

SINGLE AWARD

Due to the interrelationship of the supplies to be provided, the Government intends to make a single award to the offeror whose offer is considered in the best interest of the Government, price and other factors considered. Therefore, offerors proposing less than the entire effort specified herein may be determined to be unacceptable.

TECHNICAL/ENGINEERING SUPPORT

Engineering Support and On-Site Technical Support are covered by line items 0032 and 0033, respectively. Offerors are requested to determine their cost proposals for each subline item under line items 0032 and 0033 by using their applicable burdened labor rates (regular or overtime as applicable) multiplied by the Government estimate for the number of hours shown for each subline item.

TRAVEL AND MATERIALS COSTS

The Travel and Material costs associated with On-Site Technical Support are covered by Line Items 0034 and 0035, respectively. The Government has established the following "not-to-exceed" costs for these items:

LINE ITEM	"Not-to-Exceed" Cost
0034AA	\$13,000.00
0034AB	\$5,000.00
0034AC	\$5,000.00
0034AD	\$5,000.00

0034AE	\$5,000.00
0035AA	\$15,000.00
0035AB	\$7,500.00
0035AC	\$7,500.00
0035AD	\$7,500.00
0035AE	\$7,500.00

Offerors should use the amounts listed above for these line items in their proposals. Contractors will be reimbursed for all actual allowable and allocable costs for these items in accordance with FAR Part 31 and the Joint Travel Regulations subject to the ceiling limitations.

Section C - Descriptions and Specifications

PROCUREMENT SPECIFICATION

**PROCUREMENT SPECIFICATION
FOR
MACHINERY CONTROL SYSTEM
ON US NAVY SHIPS**

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1. GENERAL SPECIFICATIONS

- 1.1 This specification has been developed to establish minimum hardware requirements for a Machinery Control System (MCS) that will control the machinery equipment onboard US Navy ships. The MCS includes, but is not limited to, the Firemain System, Interior Communication/Standard Module (IC/SM) Alarm Monitoring System, List Control System, JP-5 System, and Data Acquisition System (DAS), currently the Integrated Condition Assessment System (ICAS). The objective of the new Control System will be to improve reliability, maintainability, and efficiency by reducing Total Ownership Cost (TOC) and downtime. The new system shall be designed to easily interface with existing shipboard systems. A laboratory version of the shipboard control system will be installed at NSWCCD Philadelphia.
- 1.2 The MCS will be comprised of multiple Programmable Logic Controller (PLC) based units. The PLC units will consist of a group of Input/Output (I/O) enclosures, one or more of which will contain a PLC processor. These groups will communicate via Industrial Ethernet (IE). Computer workstations and Operator Interface Panels (OIPs) will interface between the machinery operators and the PLC processors. Communication between the I/O enclosures, PLC processors and OIPs will be performed through IE Switch Enclosures. A PLC group shall be designated as one or more processors, a variable number of enclosures containing field I/O and an IE Switch providing communication between the various elements of the group, any local operator computers and the ship's fiber optic MCS Local Area Network (LAN).
- 1.3 Industrial Ethernet switches shall be installed in an enclosure. The enclosure shall contain all terminations, power supplies, and ancillary devices needed to safely operate the switch and interface with the external devices. Two sources of power (AC and/or DC) are required for each IE enclosure. If either source is momentarily or permanently disrupted, the switch will continue operating without interruption. The primary power source for the switch will be 24 VDC, although AC sources may be supplied to the enclosure and converted to DC within the enclosure. An industrial or military grade Automatic Bus Transfer (ABT) may be used to accomplish this switchover. The IE enclosure shall be required to accept copper type CAT-5 (MIL-DTL-24643B) and fiber optic (MIL-PRF-85045F and MIL-PRF-49291) cabling and terminations. The CAT-5 connections will require a means of interfacing with shielded CAT-5 watertight cable (MIL-DTL-24643B), via interface terminal. The fiber optic connections shall be of the military grade ST (MIL-C-83522/16B) type. All components within the enclosure shall be finger-safe or covered with a protective, non-conducting material (e.g. lexicon) to prevent incidental contact with energized surfaces during routine maintenance for components containing voltage levels greater than 30 VDC.
- 1.4 I/O enclosure containing a PLC processor — This enclosure shall consist of an I/O chassis, I/O modules (Discrete and Analog), PLC Processor and supporting power supplies. The enclosure shall contain all necessary hardware to interface with the field machinery including terminal block/strips for terminating all required field wiring, power supplies required for loop and I/O power, and any necessary relays, transducers or other electronics. The I/O enclosure shall be required to accept copper type CAT-5 (MIL-DTL-24643B) or fiber optic (MIL-PRF-85045F and MIL-PRF-49291) cabling and terminations. Two independent Ethernet communication paths will be required; one to communicate with the OIPs, computer workstations and the ship's LAN; the other to communicate with other remote I/O enclosures within the group that do not contain PLC processors via an IE enclosure. Two sources of AC power will supply the I/O enclosure. The PLC processor, I/O modules, power supplies and all supporting equipment must maintain operation in the event of a momentary or permanent power loss to either source without interruption. An industrial or military grade ABT may be used to accomplish this

switchover. All components within the enclosure shall be finger-safe or covered with a protective, non-conducting material (e.g. lexicon) to prevent incidental contact with energized surfaces during routine maintenance for components containing voltage levels greater than 30 VDC.

- 1.5 I/O enclosure without a PLC processor — This enclosure shall consist of an I/O chassis, I/O modules (Discrete and Analog) and supporting power supplies. The enclosure shall contain all necessary hardware to interface with the field machinery including terminal block/strips for terminating all required field wiring, power supplies required for loop and I/O power, and any necessary relays, transducers or other electronics. The I/O enclosure shall be required to accept copper type CAT-5 (MIL-DTL-24643B) or fiber optic (MIL-PRF-85045F and MIL-PRF-49291) cabling and terminations. One Ethernet communication path will be required to communicate with I/O enclosure(s) containing the PLC processor via the IE enclosure. Two sources of AC power will supply the I/O enclosure. The I/O modules, power supplies and all supporting equipment must maintain operation in the event of a momentary or permanent power loss to either source without interruption. An industrial or military grade ABT may be used to accomplish this switchover. All components within the enclosure shall be finger-safe or covered with a protective, non-conducting material (e.g. lexicon) to prevent incidental contact with energized surfaces during routine maintenance for components containing voltage levels greater than 30 VDC.
- 1.6 This procurement specification can be used to support machinery control systems aboard all US Navy ships. Portions of this specification do refer to a typical ship set required to support MCS on a CVN-68 Class ship. This is just one example of the type of control system and ship class that this equipment can support. For the typical CVN, 12 I/O groups are required for the MCS. The composition of these groups, including the Industrial Ethernet components, are included in Attachments 11.1 through 11.3. The final configuration is subject to change and will be determined by the government In Service Engineering Agent (ISEA).
- 1.7 The MCS shall be connected to a government furnished fiber optic Ethernet LAN that will provide inter-PLC communications as well as communications with Windows XP Embedded™ based processors. The Windows XP Embedded™ based processors will contain the Human Machine Interface (HMI) computer program. The Windows XP Embedded™ based processors and HMIs shall be provided and developed by the government ISEA.
- 1.8 The I/O enclosure shall maximize available space. The requirements for non-isolated I/O and the enclosure limits are as follows:
 24" x 24" x 8" (96 points of I/O)
 30" x 36" x 8" (160 points of I/O)
 The exact distribution of I/O modules is contained in Attachment 11.1. Additionally, the internal health of the I/O enclosure shall be monitored. At a minimum, all power supplies, with the exception of the PLC chassis power supply and the primary/secondary sources to the I/O enclosure, will be monitored for their state. Either analog or discrete I/O may be used to accomplish this.

A rack mounted I/O design is also required to monitor IC/SM alarm signals. This I/O rack will be mounted in Damage Control Central (DCC) and would take advantage of the existing cable run for IC/SM alarm monitoring. The I/O rack will meet the same environmental specifications as the I/O enclosures. A minimum of 240 IC/SM alarm signals will populate the I/O rack and shall not exceed 63 inches in usable rack height (36U). A means of isolating grounds between signals must also be included. This may be accomplished either by automatically placing the grounded signal in cutout or isolating

each channel including sense voltage from the others. The subcomponents of this I/O rack must include the same requirements as the I/O enclosures (i.e. dual sources of AC power and connectivity).

- 1.9 The I/O enclosures shall interface with various I/O signal types as defined by various terminal harnesses. The harness types will be used in the contractor's design documentation. All discrete type signals shall be software configurable for either latching or momentary type action. The harness shall consist of finger-safe, DIN rail mounted wiring terminals as well as required wiring between aforementioned wiring terminals and the respective I/O module channels. Every module channel shall be wired to terminals, even if the channels are currently unused. The hot side of every AC and DC signal shall be fused with a blown fuse indicator. The neutral side of every AC signal (but not the neutral side of DC signals) shall be fused with a blown fuse indicator. Light Emitting Diode (LED) type fuse indicators will be used for all DC signals and Neon type fuse indicators will be used for all AC signals. The fuse size required shall be marked on every fuse holder. The fuse holder shall be either hinged or removable to gain access to the fuse. Analog signals shall have grounding terminals throughout the terminal board to allow for no greater than 4 inches from the signal connections to the shield drain wire. The harness types and descriptions that will be used are as follows:
- 1.9.1 Harness Type (IAN): Non-Isolated 115 VAC Input with internally sourced voltages from within the I/O enclosure to the field device, across dry contacts
 - 1.9.2 Harness Type (IAI): Isolated 115 VAC Input with externally sourced voltages from the field
 - 1.9.3 Harness Type (IDN): Non-Isolated 24 VDC Input with internally sourced voltages from within the I/O enclosure to the field device, across dry contacts
 - 1.9.4 Harness Type (ISN/QDN/QDN32): A pair of harnesses that perform the following function (note that the QDN32 is rack mount only, and the QDN is wall mount only): Non-Isolated Supervisory Input with internally sourced voltages (of less than 30 VDC) from within the I/O enclosure to the field device, across dry contacts with a 6.8 KOhm resistor installed in the field parallel to the contacts. The circuit shall be capable of detecting open contacts, closed contacts and broken wires. A means of isolating grounds between signals must also be included. This may be accomplished either by automatically placing the grounded signal in cutout or isolating each channel including sense voltage from the others
 - 1.9.5 Harness Type (QAN): Non-Isolated 115 VAC Output with internally sourced voltages from within the I/O enclosure to low current field coils (2 Amp resistive or inductive steady state)
 - 1.9.6 Harness Type (QKW): Isolated Normally Open (NO) dry contact outputs interfaced with externally sourced voltages supplied into the I/O enclosure. The externally sourced voltages can range from 5 VDC to 115 VAC. The maximum current across the contacts will be 2 Amp resistive or inductive steady state. 1000 VDC of isolation between channels is required at a minimum
 - 1.9.7 Harness Type (QKX): Isolated Configurable Contact with either Normally Open (NO) or Normally Closed (NC) Output interfaced with externally sourced voltages supplied into the I/O enclosure. The externally sourced voltages can range from 5 VDC to 115 VAC. The maximum current across the contacts will be 2 Amp resistive or inductive steady state. 1000 VDC of isolation between channels is required at a minimum

- 1.9.8 Harness Type (QK6): Isolated Configurable Contact with either Normally Open (NO) or Normally Closed (NC) Output interfaced with externally sourced voltages supplied into the I/O enclosure. The externally sourced voltages will be 115 VAC with a maximum current across the contacts of 6 Amp resistive or inductive steady state. 1000 VDC of isolation between channels is required at a minimum
- 1.9.9 Harness Type (ACN): Non-Isolated Analog 4-20mA DC Input through two wire current sink with an internally sourced 24 VDC voltage supplied from within the I/O enclosure. The input module shall have under-range and over-range capability and a 16 bit Analog to Digital (A/D) converter
- 1.9.10 Harness Type (AVN): Non-Isolated Analog 0-10VDC Input through three wire voltage source with an internally sourced 10VDC voltage supplied from within the I/O enclosure. The input module shall have under-range and over-range capability and a 16 bit Analog to Digital (A/D) converter
- 1.9.11 Harness Type (AR3): Isolated Analog Resistance Temperature Detector (RTD) Input through three wires (i.e. signal, common and compensation). The input module will compensate for losses due to cable distance and will have under-range and over-range capability and a 16 bit Analog to Digital (A/D) converter. The input module will be configurable for various RTD types and will include 100 Ohm platinum (385 curve), 100 Ohm platinum (392 curve) and 120 Ohm nickel (672 curve). Each module channel shall be configurable to a unique curve. 1000 VDC of isolation between channels is required at a minimum
- 1.9.12 Harness Type (AOC): Isolated Analog Output capable of 0-200 μ Amp DC, 4-20mA DC or 0-10VDC. Resistors may be used to modify the ranges. The output module shall have a 16 bit or greater resolution Discrete to Analog (D/A) converter. 1000 VDC of isolation between channels is required at a minimum
- 1.9.13 Harness Type (ACI): Isolated Analog Input capable of ranges of either 4-20mA DC or 0-10VDC. The input module will be configurable to switch between current and voltage inputs without using module jumpers and will have a 16 bit Analog to Discrete (A/D) Converter. 1000 VDC of isolation between channels is required at a minimum
- 1.10 There are approximately 3800 auxiliary machinery plant signals that require interface with the MCS. The signals are distributed among the approximately 70 I/O enclosures that make up a typical MCS ship set. The specific I/O signal list will be provided in individual delivery orders.

2. ENCLOSURE MATERIAL AND DESIGN

- 2.1 Various I/O enclosure sizes are required for MCS installations onboard US Navy ships. All I/O enclosures must be capable of containing a PLC processor and the necessary supporting components to ensure that the processor can control the I/O group. An enclosure that contains a PLC processor shall have an additional Ethernet connection and an RTD installed in the I/O enclosure to monitor the internal ambient temperature. The RTD shall be a 100 Ohm platinum type referenced to either the DIN385 or DIN392 curves.
- 2.2 All I/O enclosures shall have a 3/16" diameter grounding stud mounted on the rear of the enclosure, outside of the shock envelope, which will be wired to the enclosure grounding bus. The front panel of hinged enclosures shall have a safety ground connected to a grounding bus. Safety grounds will be installed on all 24 VDC power supplies, I/O chassis and I/O power supplies. All grounding locations shall be properly cleaned of paint, coating etc. to ensure a proper bond.
- 2.3 All I/O enclosures shall contain DIN rail mounting for field interface components such as terminals, herein referred to as "terminal boards". All terminal boards shall be clearly labeled. All terminal boards shall not contain exposed sharp edges. All terminal boards shall have end barriers and end clamps.
- 2.4 All I/O enclosure terminal boards will be clearly labeled with the terminal board number and fuse size (where required). Terminal boards will consist of straight through feeds, fused feeds, relays and/or ground terminals. Straight through feed terminal boards will be used for all DC returns, RTD signals and voltage inputs. Fused terminal boards with blown fuse indicators will be used for all DC excitation points and both sides of all AC signals. Relays shall be used for all field interface signals exceeding the I/O module specifications or to isolate supervisory inputs from the rest of the I/O enclosure components. Straight through ground terminal boards shall be installed at locations throughout any analog terminal board that are connected to the I/O enclosure ground bus. Main power distribution will use two-layer straight through feed terminal boards between the source and the individual terminal boards. The source power to or from the enclosure shall be fused with hinged blown fuse indicators for both the power and return wires.
- 2.5 All I/O enclosures containing supervisory inputs shall either utilize isolated power and modules to monitor those signals or shall monitor the state of the power source to determine if the power source is grounded.
- 2.6 I/O enclosures that require fiber connectivity shall interface directly with an Ethernet module or will have a DIN rail mounted, fiber to copper media converter. The fiber end connector shall be military grade ST (MIL-C-83522/16B) type.
- 2.7 All optional components shall have their mounting support equipment installed even if the optional components are not installed. For example, a 24 VDC field power supply mounting kit shall be installed in each enclosure even if that enclosure does not currently require one.
- 2.8 The following I/O enclosure sizes shall be supported:
 - 2.8.1 A 24"x24"x8" submersible (per MIL-STD-108E, Notice 1) enclosure shall be designed with a removable cover. This enclosure must be able to support the following I/O density:

- 2.8.1.1 96 points of isolated or non-isolated discrete inputs/outputs (AC or DC)
 - 2.8.1.2 96 points of single-ended analog inputs (4-20mA or 0-10VDC)
 - 2.8.1.3 48 points of isolated 3 wire RTD inputs
 - 2.8.1.4 48 points of supervisory inputs
 - 2.8.1.5 48 points of isolated analog outputs configurable for 0-200µA, 4-20mA, 0-10VDC or -10 to 0 to 10VDC
 - 2.8.1.6 Any combination of the above
- 2.8.2 A 24"x24"x8" and 24"x24"x10" drip-proof (per NEMA 4) enclosure shall be designed with a hinged cover. Both types will include an optional removable cover. The hinged enclosure shall include a data pocket on the back of the front cover. These enclosures must be able to support the following I/O density:
 - 2.8.2.1 96 points of isolated or non-isolated discrete inputs/outputs (AC or DC)
 - 2.8.2.2 96 points of single-ended analog inputs (4-20mA or 0-10VDC)
 - 2.8.2.3 48 points of isolated 3 wire RTD inputs
 - 2.8.2.4 48 points of supervisory inputs
 - 2.8.2.5 48 points of isolated analog outputs configurable for 0-200µA, 4-20mA, 0-10VDC or -10 to 0 to 10VDC.
 - 2.8.2.6 Any combination of the above
- 2.8.3 A 30"x36"x8" drip-proof (per NEMA 4) enclosure shall be designed with a hinged cover. This design will include a version with a removable cover. The hinged enclosure shall include a data pocket on the back of the front cover. The enclosure must be able to support the following I/O density:
 - 2.8.3.1 160 points of isolated or non-isolated discrete inputs/outputs (AC or DC)
 - 2.8.3.2 160 points of single-ended analog inputs (4-20mA or 0-10VDC)
 - 2.8.3.3 80 points of isolated 3 wire RTD inputs
 - 2.8.3.4 80 points of supervisory inputs
 - 2.8.3.5 80 points of isolated analog outputs configurable for 0-200µA, 4-20mA, 0-10VDC or -10 to 0 to 10VDC.
 - 2.8.3.6 Any combination of the above
- 2.8.4 An industrial grade, 19" rack enclosure will be designed specifically for supervisory input signal types. The rack size shall not exceed 36U Height by 36" depth. This enclosure shall be able to support 240 supervisory signals in addition to the standard power monitoring features available from other I/O types.
- 2.9 Various sizes of IE enclosures are required for MCS installation onboard US Navy ships. All enclosures shall be capable of supporting both fiber optic and CAT-5 copper connections. Fiber optic connections shall be connected directly to a fiber optic module or to a fiber optic patch panel and terminated with military grade ST(MIL-C- (MIL-C-83522/16B) type connections. CAT-5 copper type connections will interface with a terminal board or punch block system to provide ease of installation. Standard CAT-5 patch cords will be installed between the terminal board and the RJ-45 Ethernet switch ports on the modules.
- 2.10 All IE enclosures shall have a 3/16" diameter grounding stud mounted on the rear of the enclosure outside of the shock envelope which will be wired to the enclosure grounding bus. All grounding locations shall be properly cleaned of paint, coating etc. to ensure a proper bond.
- 2.11 All IE enclosures shall contain DIN rail mounting for field interface components such as terminal boards. All terminal boards shall be clearly labeled. Terminal boards shall not

contain exposed sharp edges. All terminal boards shall have end barriers and end clamps.

- 2.12 IE enclosure terminal boards will be clearly labeled with the terminal board number and fuse size (where required).
- 2.13 All optional IE components shall have their mounting support equipment installed even if the optional components are not installed. For example, a 24 VDC field power supply mounting kit shall be installed in each enclosure even if that enclosure does not require one.
- 2.14 The following IE enclosure sizes shall be supported:
 - 2.14.1 A 24"x24"x10" submersible (per MIL-STD-108E, Notice 1) IE enclosure shall be designed with a removable cover. Two sources of power will be provided to this enclosure. The IE switches will continue operation without incident if either source is temporarily or permanently interrupted. Supported power sources must include 24VDC or 115VAC. A 5A 24VDC power supply will be included in the enclosure for use with AC supply sources. Primary and secondary sources can be any combination of AC or DC. The enclosure will contain a 3 wire mounted RTD sourced to the DIN385 or DIN392 platinum, 100 ohm curve for monitoring enclosure temperature. All components will be either finger safe or have a lexicon cover preventing accidental contact with live terminals. This enclosure must be able to support the following number of Ethernet connections:
 - 2.14.1.1 48 CAT-5 RJ45 connections
 - 2.14.1.2 48 Fiber ST (MIL-C-83522/16B) connections
 - 2.14.1.3 Any combination of the above
 - 2.14.2 A 24"x24"x10" drip-proof (per NEMA 4) IE enclosure shall be designed with a hinged cover. The enclosure shall include a data pocket on the back of the front cover. Two sources of power will be provided to this enclosure. The IE switches will continue operation without incident if either source is temporarily or permanently interrupted. Supported power sources must include 24VDC or 115VAC. Primary and secondary sources can be any combination of AC or DC. A 5A 24VDC power supply will be included in the enclosure for use with AC supply sources. The enclosure will contain a 3 wire mounted RTD sourced to the DIN385 or DIN392 platinum, 100 ohm curve for monitoring enclosure temperature. All components will be either finger safe or have a lexicon cover preventing accidental contact with live terminals. This enclosure must be able to support the following number of Ethernet connections:
 - 2.14.2.1 48 CAT-5 RJ45 connections
 - 2.14.2.2 48 Fiber ST (MIL-C-83522/16B/16B) connections
 - 2.14.2.3 Any combination of the above
 - 2.14.3 A 16"x16"x10" submersible (per MIL-STD-108E, Notice 1) IE enclosure shall be designed with a removable cover. Two sources of power will be provided to this enclosure. The IE switches will continue operation without incident if either source is temporarily or permanently interrupted. Primary power will always be 24VDC. Secondary power can be either a second 24VDC source or 115VAC source. A 1A 24VDC power supply will be included in the enclosure for use with an AC secondary power source. The enclosure will contain a 3 wire mounted RTD sourced to the DIN385 or DIN392 platinum, 100 ohm curve for monitoring enclosure temperature. All components will be either finger safe or have a lexicon cover preventing accidental contact with live terminals. This enclosure

must be able to support the following number of Ethernet connections:

- 2.14.3.1 16 CAT-5 RJ45 connections
 - 2.14.3.2 10 Fiber ST (MIL-C-83522/16B/16B) connections with 6 CAT-5 RJ45 connections
 - 2.14.3.3 Any combination of the above
- 2.14.4 A 16"x16"x10" drip-proof (per NEMA 4) IE enclosure shall be designed with a hinged cover. The enclosure shall include a data pocket on the back of the front cover. Two sources of power will be provided to this enclosure. The IE switches will continue operation without incident if either source is temporarily or permanently interrupted. Primary power will always be 24VDC. Secondary power can be either a second 24VDC source or 115VAC source. A 1A 24VDC power supply will be included in the enclosure for use with an AC secondary power source. The enclosure will contain a 3 wire mounted RTD sourced to the D1N385 or DIN392 platinum, 100 ohm curve for monitoring enclosure temperature. All components will be either finger safe or have a lexicon cover preventing accidental contact with live terminals. This enclosure must be able to support the following number of Ethernet connections:
- 2.14.4.1 16 CAT-5 RJ45 connections
 - 2.14.4.2 10 Fiber ST (MIL-C-83522/16B) connections with 6 CAT-5 RJ45 connections
 - 2.14.4.3 Any combination of the above
- 2.15 All components mounted in either the I/O or IE enclosures shall be capable of being removed and re-inserted from the front side of the enclosure. Removal of a component will not require removing the entire enclosure gland plate. Rivnuts or pre-dilled grooved installation holes are both acceptable means of accomplishing this.
- 2.16 All I/O and IE enclosures shall meet the various environmental requirements of MIL-STD-461E, MIL-STD-167-I, MIL-STD-108E (for enclosures designated as submersible) and MIL-S-901D.
- 2.17 Each enclosure shall have an attached phonemic nameplate representing the enclosure and function.
- 2.18 Conservation of weight shall be considered when at all possible. All components and material shall be selected using the lightest material possible yet still remain compliant to all-applicable standards and functionality.
- 2.19 No penetrations of hardware (e.g. screws, bolts, pins etc.) shall be made through the walls or door of an enclosure, in order to maintain its maximum watertight integrity.
- 2.20 Enclosures shall be designed to accept plant interface cables through watertight strain relief/stuffing tubes (MIL-S-19622F). The design must be made to facilitate connection with existing plant cables. Using information provided by the government, the contractor shall provide removable gland plates on two sides of the enclosures so they can be removed to drill holes for the stuffing tubes.
- 2.21 All internal enclosure wiring terminations will require the use of tinning or ferrules. No more than 2 wires shall be combined into one ferrule. Cutting off strands of copper to reduce size of lead to fit ferrule is prohibited.
- 2.22 Pre-fabricated, metal jumper strips shall be used where multiple (i.e. greater than 2) terminations are required.

- 2.23 All internal enclosure wiring, with the exception of jumper wires shorter than 4", shall be properly labeled with "to/from" information (e.g. TB0-12/TB3-8) on heat shrinkable, non-smearing, oil-resistant wire markers as per MIL-I-23053.
- 2.24 All internal enclosure wiring will be low smoke and meet the requirements of MIL-W-81044. Only non-PVC wire shall be used within an enclosure.
- 2.25 All internal enclosure wiring shall adhere to the following requirements:
 - 2.25.1 All DC circuits up to 2A shall use 20AWG wire
 - 2.25.2 All AC circuits up to 2A shall use 18AWG wire
 - 2.25.3 All AC circuits greater than 2A shall use 16AWG wire
 - 2.25.4 All grounds shall use 14AWG wire
- 2.26 All enclosure fuse ratings shall adhere to the following requirements:
 - 2.26.1 All primary and secondary 120VAC power sources into an enclosure shall use 4A slow blow fuses
 - 2.26.2 All 120VAC input signals shall use 1A fast acting fuses
 - 2.26.3 All 120VAC output signals shall use 2A fast acting fuses
 - 2.26.4 All JP5 service pump 120VAC output signals shall use 6A fast acting fuses
 - 2.26.5 All 24VDC input signals shall use 1A fast acting fuses
 - 2.26.6 All 24VDC output signals shall use 2A fast acting fuses
 - 2.26.7 All 4-20mA signals shall use 0.5A fast acting fuses
 - 2.26.8 All 24VDC power sources into an IE enclosure shall use 4A slow blow fuses
 - 2.26.9 All RTD signals shall NOT be fused
- 2.27 All enclosure types (i.e. enclosures and racks, drip proof and submersible) shall require keyed locking devices to secure entry. No penetrations shall be made through an enclosure that compromise its watertight integrity. It is preferable that the locking device be integral with the enclosure. However, if necessary, and as approved by the government agency, additional mounting brackets, clasps, hardware can be fitted to an enclosure to accommodate the security devices.
- 2.28 All internal enclosure wire termination, routing, splicing, banding, securing and other electrical/electronic enclosure techniques shall conform to the standards of Electronic Installation and Maintenance Book (EIMB), NAVSEA 0967-LP-000-0110
- 2.29 All enclosures shall provide for an EMI power line filter for all AC input power sources. The EMI power line filter shall meet all applicable military specification, as stated in Paragraph 6.
- 2.30 All hardware of the I/O and IE enclosures shall be capable of operating at an ambient temperature of 0 to 55⁰C (32 to 130⁰F), with an ambient temperature rating for storage of -40 to +85⁰C (-40 to +185⁰F).

3. PLC ENCLOSURE COMPONENTS

- 3.1. Reliability. The mean time between failure (MTBF) shall be a minimum of 20,000 operating hours. All components of the PLC system shall require maintenance not more frequently than annually.
- 3.2. Duty. The PLC shall be constructed to operate for continuous duty and general-purpose service as specified in MIL-C-2212.
- 3.3. Diagnostics. The PLC system shall have resource and diagnostic control at all system levels. The PLC system shall provide diagnostics capabilities to allow troubleshooting down to the lowest replaceable unit. Diagnostics shall be of power up and on-line type. The PLC shall be capable of supporting a device that will display diagnostic results, status of selectable addresses, and the suspected modules that could cause the failure. The elimination of suspected failed modules shall be a maximum of three of the most likely modules that could cause that particular failure.
- 3.4. Logic function. The internal wiring of the controller shall be fixed, and all logic functions that shall be performed in a given application shall be programmed into its memory.
- 3.5. Serial port. The PLC shall have one dedicated serial port that supports Electronic Industries Alliance (EIA) 232 signals. It shall be accessible in control logic and provide support for Master and Slave SCADA communication protocol systems. Alternatively, it shall be usable for programming purposes or for access to peripheral devices such as bar code scanners, CRTs, etc.
- 3.6. Electrical service. The PLC shall operate in compliance with an electrical service of either 120 VAC, single phase, in the frequency range from 47 to 63 Hz, or 24 VDC.
- 3.7. Cooling. All system modules, main and expansion chassis shall provide free airflow convection cooling. No internal fans or other means of cooling, except heat sinks, shall be permitted.
- 3.8. Central processing unit.
 - 3.8.1. Function. The PLC Central Processing Unit (CPU) shall be a self-contained unit and shall provide control program execution, I/O scanning and support remote or local programming.
 - 3.8.2. Discrete and analog points. The processor shall be capable of addressing a minimum of 10,000 discrete points or 1,000 analog points. Processor shall be capable of communicating with 50 physical locations each containing I/O as a minimum
 - 3.8.3. Multiple independent, asynchronous scans. The PLC processor shall use designated scans for processing of input and output information, program logic, and background processing of other processor functions. Input and output devices located in the same backplane (local I/O) as the CPU shall produce at the rate of the configured Requested Packet Interval (RPI), and for inputs enabled for Change of State (COS), at the time any point changes state. Scan rates for devices located in backplanes other than that in which the processor is located shall be user selectable and shall range from 2 to 100 milliseconds (ms).
 - 3.8.4. Features. The processor shall contain the following performance features as a minimum:

- 3.8.4.1 16K user memory words capability.
 - 3.8.4.2 Ladder logic, Sequential Function Chart (SFC), and structured-text programming support compliant with the IEC 61131-3 standard.
 - 3.8.4.3. Configurable EIA 232 port for programming.
 - 3.8.4.4. Advanced instruction set including file handling, sequencer, diagnostic, shift register, immediate-I/O, and program control instructions.
 - 3.8.4.5. Multiple main control programs for segregation of control tasks.
 - 3.8.4.6. Processor input interrupts and global status flags.
 - 3.8.4.7. Programmable fault response for reacting to a fault before the system goes down.
 - 3.8.4.8. Timed-interrupt routine for examining specific information at specific time intervals.
- 3.8.5. Removable programmable devices. The operating system and application specific program files shall be contained in removable programmable devices that allow for easy field replacement.
- 3.8.6. Fault indication. The CPU shall perform internal diagnostic checks and give visual indication to the user by illuminating a "green" indicator when no fault is detected and a "red" indicator when a fault is detected as specified.
- 3.8.7. Data bits. The CPU shall be capable of addressing at least 48,000 words comprised of 16 data bits.
- 3.8.8. User program. The user programs and data shall be contained in non-volatile memory.
- 3.8.9. Firmware. The operating system shall be contained in non-volatile firmware.
- 3.8.10. Memory. The controller shall contain no less than 100 kilobytes of base memory. It shall provide the capability to increase the memory up to at least 2 megabytes.
- 3.8.11. Mode selector switch. The processor mode shall be selectable by a key switch mounted on the front panel of the CPU. The key switch shall allow the selection of the following modes:
- 3.8.11.1. RUN - No control logic edits possible, program always executing.
 - 3.8.11.2. PROGRAM - Programming allowed, program execution disabled.
 - 3.8.11.3. REMOTE - Programming terminal can make edits and change processor mode, including TEST mode, whereby the logic executes and inputs are monitored, but edits are not permanently active unless assembled.
- 3.8.12. Processor fault. The PLC shall provide a visual indication of a PLC processor fault. By default, a PLC processor fault shall cause analog control signals to fail in the last state and digital control signals to fail in the low state. The PLC shall have the capability for the discrete output signals to fail to its last known state. The PLC shall provide the capability to change the analog and digital control signal state in response to a failure. If the fault is caused by a memory problem, it shall be possible to clear the fault using a procedure to boot the PLC from the EEPROM or FLASHROM memory. The devices associated with the control signals shall remain in the last state, with the exception of signals that require a continuous output voltage.
- 3.8.13. Power loss. A total loss of 120 VAC supplying the PLC shall cause the PLC

system to shutdown. All control signals associated with that PLC shall fail in the low state. Loss of 24-VDC PLC power supply shall prevent commands associated with that PLC from being energized. Status change signals that do not have alarms associated with them shall display the open state of the digital contact. Control signals that rely on 24-VDC power from the PLC cabinet shall fail to energize.

- 3.8.14. Input and output devices. Input and output devices located in the same backplane (local I/O) as the CPU shall be capable of being scanned synchronously in under 0.5 ms. Concurrent with this I/O update time, the processing of a typical logic program shall not exceed 0.5 to 2 ms for 1024 instructions with a maximum overhead of 4.5 ms.
- 3.8.15. Remote input and output devices. Input and output devices located remotely should be capable of being scanned in under 10 ms for a 57.6-kilobyte/sec transfer rate, under 7 ms for a 115.2-kilobyte/sec transfer rate, and under 3 ms for a 230.4-kilobyte/sec transfer rate.
- 3.9. Chassis. The I/O chassis shall be capable of holding the CPU, communication modules and I/O modules. The chassis size shall be a minimum of 5 incremental sizes ranging between 4 and 20 module slots.
 - 3.9.1. Indicators. The following indicators and status information shall be shown on the chassis or modules within the chassis:
 - 3.9.1.1. PROGRAM or RUN mode of the CPU.
 - 3.9.1.2. The RUN/FAULT status of the CPU.
 - 3.9.1.3. ENABLED/DISABLED state of outputs.
 - 3.9.1.4. State of the I/O adapters.
 - 3.9.1.5. Data I/O forces PRESENT/ACTIVE.
 - 3.9.1.6. Remote device communicating via the inter-processor communications link.
 - 3.9.1.7. Status of the Ethernet transceiver port.
 - 3.9.1.8. Data transfer activity over the Ethernet.
 - 3.9.1.9. EIA 232 activity.
 - 3.9.2. Mounting and construction. The PLC chassis shall be capable of being back stud mounted to an enclosure panel without the need for an external bracket.
 - 3.9.3. Internal power distribution. In a single chassis, all system and signal power to the CPU and support modules shall be distributed on a single motherboard or back plane with no interconnecting wiring between these modules via plug-term mated jumpers.
 - 3.9.4. Removable modules. All system modules shall have the option of being removed from the chassis or inserted into the chassis while power is being supplied to the chassis without faulting the processor or damaging the modules.
 - 3.9.5. PLC modules. PLC modules shall plug and lock into the PLC chassis.
 - 3.9.6. Key ways. Modules shall be keyed to allow installation in predetermined slots and proper direction.
 - 3.9.7. Self-contained unit. Each module shall be a self-contained unit housed within an enclosure.

- 3.9.8. Analog and discrete signals . The PLC system shall be capable of addressing a minimum of 1,000 analog or 10,000 discrete signals necessary to interface with the shipboard system(s). The PLC system shall be able to interface with the following signal types:

3.9.8.1. Analog Input:

- 3.9.8.1.1. - 10 to 10VDC
- 3.9.8.1.2. 0 to 160 VAC (60 Hz)
- 3.9.8.1.3. 4 to 20 mA
- 3.9.8.1.4. ± 20 mA
- 3.9.8.1.5. 0 to 5 A (60 Hz)
- 3.9.8.1.6. Tachometer
- 3.9.8.1.7. RTD
- 3.9.8.1.8. Thermocouple

3.9.8.2. Analog Output:

- 3.9.8.2.1. -10 to 10VDC
- 3.9.8.2.2. 4 to 20 mA
- 3.9.8.2.3. ± 20 mA

3.9.8.3. Digital Input:

- 3.9.8.3.1. 115 VAC Discrete Inputs (Isolated and Non-Isolated)
- 3.9.8.3.2. 24 VDC Discrete Input (Non-Isolated, Normally Open or Normally Closed)
- 3.9.8.3.3. Supervisory Contact Input (Normally Open or Normally Closed)
- 3.9.8.3.4. VDC Discrete Input (Non-Isolated)

3.9.8.4. Digital Output:

- 3.9.8.4.1. 115 VAC Discrete Output (Maintained or Momentary)
- 3.9.8.4.2. 24 VDC Discrete Output (Maintained or Momentary)
- 3.9.8.4.3. 28 VDC Discrete Output (Maintained or Momentary)
- 3.9.8.4.4. Normally Open Contact (Isolated or Non-Isolated)
- 3.9.8.4.5. Normally Closed Contact. (Isolated or Non-Isolated)

- 3.9.9. I/O modules types. The following types of I/O modules shall be available for use in the PLC chassis:

- 3.9.9.1. 16-channel (minimum) 10-to 30-VDC Digital Input Module capable of being selectable to reset or hold last state during a fault.
- 3.9.9.2. 16-channel (minimum) 0- to 30-VDC Diagnostic Discrete Input Module. The card shall be able to detect a wire break versus an open contact.
- 3.9.9.3. 6-channel (minimum) 16-bit RTD Input Module capable of reporting degrees Celsius ($^{\circ}\text{C}$), degrees Fahrenheit ($^{\circ}\text{F}$), or current for 100-ohm platinum multiple curves including 385 and 392, 120-ohm nickel multiple curves including 672 and 618 curve, or 10-ohm copper sensors.
- 3.9.9.4. 6-channel (minimum) 16-bit Thermocouple Input Module capable of interfacing with type B, C, E, J, K, N, R, S, and T thermocouples.
- 3.9.9.5. 16-channel (minimum) 12-bit Analog Input Module capable of 0 to 5 VDC, ± 5 VDC, ± 10 VDC, 4-20 mA, 0-20 mA, ± 20 mA. The card shall contain 8 differential inputs or 16 single ended inputs. The card shall provide binary or binary-coded decimal (BCD) scaling.
- 3.9.9.6. 6-channel (minimum) isolated 12-bit Analog Output Module capable of 0-5 VDC, ± 5 VDC, ± 10 VDC, 4-20 mA, 0-20 mA, ± 20 mA. The card shall contain 8 differential outputs with 1000-volt insulation. The card

- shall provide binary or BCD scaling.
- 3.9.9.7. 16-channel (minimum) 24 to 250 VAC individually isolated Contact Output Module. A minimum of 8 contact outputs shall be selectable between normally open and normally closed.
 - 3.9.9.8. 16-channel (minimum) 10- to 30-VDC Digital Output Module.
 - 3.9.9.9. 16-channel (minimum) 30- to 60-VDC Digital Output Module.
 - 3.9.9.10. A module capable of high speed power system monitoring, power system synchronization and load sharing. The module shall be capable of measuring voltage and current from the two three-phase systems and provide control and error signals to implement automatic governor control and synchronization. The module shall generate breaker closure commands within specified windows. Power transducers shall be included in the PLC system.
 - 3.9.9.11. 16-channel (minimum) 30- to 55-VDC Digital Input Module.
 - 3.9.9.12. 16-channel (minimum) 30- to 55-VDC Diagnostic Digital Input Module. The module should be able to detect a wire loss.
 - 3.9.9.13. 16-channel (minimum) 10- to 30-VAC Digital Input Module.
 - 3.9.9.14. 16-channel (minimum) 10- to 30-VAC Diagnostic Digital Input Module. The module should be able to detect a wire loss.
 - 3.9.9.15. 16-channel (minimum) 79- to 132-VAC Digital Input Module.
 - 3.9.9.16. 16-channel (minimum) 79- to 132-VAC Diagnostic Digital Input Module. The module should be able to detect a wire loss.
 - 3.9.9.17. 16-channel (minimum) 10- to 30-VAC Digital Input Module.
 - 3.9.9.18. 16-channel (minimum) 10- to 30-VAC Diagnostic Digital Output Module. The module should be able to detect loss of load or output power.
 - 3.9.9.19. 16-channel (minimum) 79- to 132-VAC Digital Output Module.
 - 3.9.9.20. 16-channel (minimum) 79- to 132-VAC Diagnostic Digital Output Module. The module should be able to detect loss of load or output power.
 - 3.9.9.21. 16-channel (minimum) 10- to 30-VDC Diagnostic Digital Output Module. The module should be able to detect loss of load or output power.
 - 3.9.9.22. 16-channel (minimum) 30- to 60-VDC Diagnostic Digital Output Module. The module should be able to detect loss of load or output power.
 - 3.9.9.23. 6-Channel (minimum) Analog Current Output Module with a scalable output range of 0 to 21 ma. Each channel must be isolated with 1000 Volt or better isolation between channels.
 - 3.9.9.24. 6-Channel (minimum) Analog Voltage Output Module with a scalable output range of -10.5 to 10.5 VDC. Each channel must be isolated with 1000 Volt or better isolation between channels
- 3.9.10. High resolution analog input module. The High Resolution Analog Input Module shall perform analog to digital conversions to directly interface analog signals to PLC data table values using a minimum of 16-bit resolution. Analog Input must be capable of being user-configured for the desired fault-response state in the event that I/O communication is disrupted. This feature shall provide a safe reaction/response in case of a fault, limit the extent of faults, and provide a predictable fault response. This module shall provide high (minimum of 1,000 volts) isolation between channels.
- 3.9.10.1. Minimum of 6 independent channels available.
 - 3.9.10.2. Minimum channel update/resolution shall be 18ms/6 channels, 36ms/16 channels, and at least 16-bit resolution.
 - 3.9.10.3. An analog module status block to provide information to the processor for alarming and troubleshooting.
 - 3.9.10.4. User-configurable output response (min, max, mid-range, or last value) for safe reaction to an analog module fault.

- 3.9.10.5. Analog module software-selectable features to include digital filtering for noisy transmitters and environments, and range selection per input.
- 3.9.10.6. Module shall be configurable for multiple ranges including 0-10 VDC, 0-20 ma, -10 to 10 VDC. Configuring a channel for current or voltage shall be accomplished in software and will not require the use of dip switches or miniature hardware jumpers on the module.
- 3.9.11. Analog alarm. Alarm indication for each analog signal shall be determined on a point-by-point basis. As a minimum, each analog signal shall have an out-of-range high and out-of-range low alarm indication (see 6.3.1 and 6.3.2). Alarm indications shall have a reset requirement. Alarm indications shall have the option of an automatic reset. The analog signal shall have only one current alarm indication such that only one alarm type shall be active for a particular signal. The hierarchy shall be as follows: Warn high shall be cleared upon receiving a high alarm; high alarm shall be cleared upon receiving an out-of-range high; Warn low shall be cleared upon receiving a low alarm; low alarm shall be cleared upon receiving an out of range low. High and low alarm indications shall be mutually exclusive, such that the active alarm is the only current alarm indication.
- 3.9.12. Analog signal status. The following status shall be programmable for each analog signal.
 - 3.9.12.1. Out-of-Range High.
 - 3.9.12.2. Alarm High.
 - 3.9.12.3. Warn High.
 - 3.9.12.4. Normal.
 - 3.9.12.5. Unknown.
 - 3.9.12.6. Warn Low.
 - 3.9.12.7. Alarm Low.
 - 3.9.12.8. Out-of-Range Low.
 - 3.9.12.9. Out-of-Service.
- 3.9.13. Digital alarms. The PLC shall be capable of supporting two (2) types of digital alarms. The first type of alarms are those determined from discrete digital input signals. Digital inputs for these types of alarms shall be fail-safe. The digital input is defined as normally open or normally closed. However, the alarm state of the contact shall be defined in such a way to cause the input contact to open when an alarm condition occurs. The second types of digital alarms are those generated by PLC logic. These types of alarms are for device level alarm indications, such as valves, pumps and diesels, and for command failures. Alarms shall be identified for each discrete digital point in each PLC.
- 3.10. Communication. The PLC system shall have the ability to support several communications options for processor-to-processor, processor to remotely located I/O racks, and processor to human machine interface (HMI) communications with a maximum of one card per communication network. BOOTP client capability shall be provided in the PLC processor to allow assignment of an IP address upon power up. The option shall be selectable on or off.
 - 3.10.1. Communication protocol types. The PLC system shall be capable of supporting token passing and (carrier sense multiple access/collision detection) CSMA/CD Ethernet protocols as specified in IEEE 802.3.
 - 3.10.2. Network media. The PLC system shall enable all communications to be accomplished through copper or fiber optic media.
 - 3.10.3. Network topologies. PLC system networks shall support star, bus, ring and/or a

combination thereof.

- 3.10.4. General network capabilities . All PLC system network communications shall contain the following performance features:
 - 3.10.4.1. Message error checking.
 - 3.10.4.2. Retries of unacknowledged messages.
 - 3.10.4.3. Diagnostic checks on other stations.
 - 3.10.4.4. Interface with more than one network.
 - 3.10.4.5. Ability to perform PLC processor memory uploads and downloads.
 - 3.10.4.6. Bi-directional communication between programmable controllers and communication networks via a standard modem interface. The communication protocol(s) shall meet EIA 232 or ANSI standard communication protocol requirements.
 - 3.10.4.7. Ability to communicate with all other models of PLCs manufactured by the same supplier.
 - 3.10.4.8. Ability to monitor the status of any processor remotely via the network.
- 3.10.5. Loss of communications. During the loss of communications, individual PLCs shall continue to run and remain in a safe state of control. Loss of communication between PLCs shall cause signals to remain in their last known state in the PLC that requires the information. Control signals shall fail in a de-energized state.
- 3.10.6. PLC processor-to-PLC processor (peer-to-peer) communications. PLC processors shall have the ability to send and receive data from other PLC processors through Ethernet and other network protocols.
- 3.10.7. PLC processor to remote I/O rack communications. PLC processors shall have the ability to send and receive data from remote I/O racks via Ethernet and other network protocols.
- 3.10.8. PLC processor to human machine interface (HMI) communications. The PLC processor shall be capable of transferring data to and from HMI application software via Ethernet TCP/IP, UDP, IP multicast, or OPC.
- 3.10.9. OLE for process control (OPC). Data communications using OPC shall be accomplished using an external OPC server software application, using the PLC processor itself as an OPC server or having a module within the PLC rack that contains an OPC server.
- 3.10.10. UDP broadcast data . The PLC processor shall be capable of sending data on a network using UDP or IP multicast protocols.
- 3.10.11. TCP/IP protocol. The PLC processor shall be capable of sending and receiving data on a network using the TCP/IP protocol. Communication with HMI devices shall require no intermediate external software applications.
- 3.10.12. Ethernet. The PLC system shall provide industry standard Ethernet communication capabilities embedded either in the PLC processor or through an Ethernet communication module.
 - 3.10.12.1. General Ethernet capabilities. The Ethernet interface shall support the following:
 - 3.10.12.1.1. Standard IP communications.
 - 3.10.12.1.2. Standard Ethernet media (10base2, 10base5, 10/100baseT, 10/100baseF).

- 3.10.12.1.3. CSMA/CD access method.
- 3.10.12.1.4. Subnet masking in order to comply with networks that use subnetting.
- 3.10.12.1.5. Standard repeaters, bridges, routers, host computers, peer PLCs.
- 3.10.12.1.6. RJ-45 and AUI ports.
- 3.10.12.1.7. BOOTP client (selectably turned on or off).
- 3.10.12.1.8. Bridging to other types of networks (e.g. ControlNet and Profibus).
- 3.10.12.1.9. Support both scheduled and unscheduled messaging simultaneously on the same Ethernet cable.
- 3.10.12.2. Network connection. The PLC processor shall have a selectable option of using IEEE 802.3 as the interface to the network as well as DIX.
- 3.10.12.3. Ethernet diagnostic status . The programmable controller shall maintain locally an Ethernet diagnostic status file that contains relative counters to record the number of retries.
- 3.10.12.4. Token passing network. The PLC system shall provide an industry standard token passing network option with the following minimum capabilities:
 - 3.10.12.4.1. Support a data transfer rate of at least 5 megabit/sec.
 - 3.10.12.4.2. Support at least 48 addressable nodes without a repeater.
 - 3.10.12.4.3. Support the use of repeaters to extend the number of addressable nodes.
 - 3.10.12.4.4. Support both scheduled and unscheduled messaging simultaneously on the same cable.
 - 3.10.12.4.5. Support update times of at least 100 ms.
 - 3.10.12.4.6. Support multiple network media and topologies.
- 3.11. Power supply. The system power supply shall be capable of converting 120 VAC line power to the DC power required to operate the programmable controller backplane, CPU, and modules. The power supply shall operate with 97 to 132 VAC, single phase, from 47 to 63 Hz or 19 to 32 VDC.
 - 3.11.1. Power up. Operation of the processor and I/O modules shall be inhibited during power up until DC values are within specified limits.
 - 3.11.2. Power shut down. Power supply shall automatically shut down the PLC system when the output current exceeds 125% of rated current. If the voltage level is out of range for more than ½ cycle, the power supply shall automatically shut down the system and remain shut down until the voltage returns to the proper level. The power supply shall provide surge protection, isolation, and outage carryover up to 2 cycles of the AC line.
 - 3.11.3. Diagnostic indicators. The PLC power supply shall include diagnostic indicators mounted in a position easily viewed by the user. These indicators shall provide the operator with the status of the DC power applied.
 - 3.11.4. Main power supply . A single main power supply shall have the capability of supplying power to the CPU and local I/O modules. Auxiliary power supplies shall provide power to remotely located racks.
 - 3.11.5. Constant voltage transformer. In cases where the AC line is especially unstable or

subject to unusual variations, it shall be possible to install a constant voltage transformer having a sinusoidal output waveform.

- 3.11.6. Insulating cover. An insulating cover shall be mounted over high voltage terminals to provide protection for maintenance personnel and allow for easy removal.
- 3.11.7. Fuse protection. The power supply shall have adequate fuse protection to prevent damage to the power supply in the event of overcurrent.
- 3.11.8. Fluctuation. The power supply shall not fluctuate for loads between 1 and 10 amps.
- 3.11.9. Auxiliary power supply. The auxiliary power supply shall include provisions for remote sensing and/or external output adjustment, and shall be short circuit proof with automatic recovery (electronic current limiting). Response time shall be less than 20 microseconds.
- 3.12. Terminal boards.
 - 3.12.1. EC type. EC type terminal boards shall be provided for field wire connections.
 - 3.12.2. Location. The terminal boards shall be located near the cable entrance.
 - 3.12.3. Accessibility. Terminal boards shall be accessible from the front of the enclosure.
 - 3.12.4. Identification. All terminal boards shall be organized and marked to establish easy identification of signals.
 - 3.12.5. Fused terminal blocks. Fused terminal boards shall be provided for 4 to 20 mA transmitters, discrete input, and discrete output signals.
- 3.13. Program creation and storage.
 - 3.13.1. Control logic programs. Control logic programs shall provide for immediate access to the sub-elements of control structures by address and sub-element mnemonic, such as timer accumulator value, timer done bit, or PID process variable value.
 - 3.13.2. Non-volatile memory. The operating system information shall be stores in non-volatile memory to protect against loss in the case of power loss or system shutdown.
 - 3.13.3. Program storage medium. The program storage medium shall be of a static RAM type. The RAM shall have the capability of being backed up by a battery.
 - 3.13.4. Memory. Memory shall be available in 48K word segments of RAM memory.
 - 3.13.5. Access method. The access method to the media shall be Carrier Sense with Multiple Access and Collision Detection (CSMA/CD).
 - 3.13.6. System power. The capability shall exist to remove all batteries from the system without removing system power.
 - 3.13.7. Non-volatile memory. The PLC processor shall provide the use of a removable non-volatile memory such as EEPROM or FLASHROM as a back up for volatile memory up to the full capacity of the controller. The memory card shall have a

capacity of at least 64MB.

- 3.13.8. Memory back-up. The capability to back-up volatile memory, including data and program logic shall be provided.
- 3.13.9. Upgradeable processor memory. The capability to upgrade to a processor memory with a larger size simply by saving a program, replacing the processor, and downloading the program to the new system without having to make any program changes shall be provided.
- 3.13.10. User memory. All user memory in the processor not used for program storage shall be allocable from main memory for the purpose of data storage. The programmable controller system shall be capable of storing predefined, user-defined and module-defined data types.
 - 3.13.10.1. Boolean values.
 - 3.13.10.2. Control structure.
 - 3.13.10.3. Counter values.
 - 3.13.10.4. Integer values.
 - 3.13.10.5. Message values.
 - 3.13.10.6. Real numbers.
 - 3.13.10.7. Signed integer numbers.
 - 3.13.10.8. Timer values.
 - 3.13.10.9. External output status.
 - 3.13.10.10. External input status.
 - 3.13.10.11. Floating point numbers.
 - 3.13.10.12. Decimal numbers.
 - 3.13.10.13. Binary numbers.
 - 3.13.10.14. BCD numbers.
 - 3.13.10.15. Direct and indexed addressing.
 - 3.13.10.16. Internal processor status information.
 - 3.13.10.17. ASCII character data.
 - 3.13.10.18. ASCII string data.
 - 3.13.10.19. Data transfer control structures.
 - 3.13.10.20. File instruction control structures.
 - 3.13.10.21. Message control structures.
- 3.13.11. Access to sub elements. Control logic programs shall have immediate access to the sub elements of control structures by address and sub element mnemonic, such as timer accumulator value, timer done bit, or PID Process Variable value.
- 3.13.12. Timer programming. The number of times a timer or counter can be programmed shall be limited only by the memory capacity to store these instructions.
- 3.13.13. Internal output programming. The number of times a normally open (NO) and/or normally closed (NC) contact of an internal output can be programmed shall be limited only by the memory capacity to store these instructions.
- 3.13.14. Application logic. The capability shall be provided to program select application logic more than once into memory.
- 3.13.15. Contacts and rungs. If contacts or entire rungs are intentionally deleted from an existing logic program, the remaining program shall be automatically repositioned to fill this void. Whenever contacts or entire rungs are intentionally

inserted into an existing program, the original program shall automatically be repositioned to accommodate the enlarged program. All rungs shall maintain their original links.

- 3.13.16. Base processor memory. Base processor memory shall be provided for user program and data.
- 3.13.17. Module-defined data. Module-defined data types shall include a structure for each I/O module and system or module specific information (hidden from user). Any data can be displayed in Binary, Octal, Hexadecimal, or Decimal radices.
- 3.13.18. User-defined data. User-defined data types shall include user-defined structures capable of containing one or more pre-defined data members.
- 3.13.19. Application program interface. Application Program Interface (API) shall be offered for Windows operating systems in the form of linkable libraries for C application programs.
- 3.13.20. Task programs. Each task can include up to 32 programs that are capable of being ordered for execution in each task.
- 3.13.21. On-line programming. On-line programming and upload/downloads of control programs shall be capable of occurring over the Ethernet network.
- 3.13.22. Programming terminal. The programming terminal shall be connected either directly to the PLC processor or via the Ethernet interface.
- 3.13.23. Software and licenses. Software and licenses shall be provided to interface the Windows based processor HMI program with the PLC processors.
- 3.13.24. Sub-system. The programmable controller sub-system shall have the ability to be updated electronically to interface with new modules
- 3.13.25. Programming format. The programming format shall be IEC 61131-3 compliant for Instruction List, Structured Text, Ladder Diagram and Function Block Diagram.
- 3.13.26. Sequential function chart and structured text operations. Sequential function chart and structured text operations shall execute in the CPU in native op codes. Representative ladder logic shall not be generated for corresponding sequential function chart and structured text operations.
- 3.13.27. Maximum instruction matrix. It shall be possible to program a maximum instruction matrix of 7 wide by 6 deep containing as many as 77 examine instructions.
- 3.13.28. Periodic tasks. Periodic tasks shall run via an interrupt at a user-defined interval in one-millisecond increments to a maximum of 2000 seconds. The periodic tasks shall have an associated, user assignable priority from one to fifteen (one being the highest priority), which specifies that task's relative execution priority in the multitasking hierarchy.
- 3.13.29. Interrupt mechanism. The interrupt mechanism of periodic tasks shall adhere to the IEC 61131-3 definition of pre-emptive multitasking.
- 3.13.30. Number of individual tasks. The controller shall be able to accommodate 32

individual tasks of which a minimum of one shall be continuous.

- 3.13.31. Watchdog timeout. Each task shall have a watchdog timeout that is unique to that task and user-defined.
- 3.13.32. Ladder logic routines. Each program shall include user ladder logic routines of which a minimum of one shall be specified in the main routine and at least one shall be specified as the fault routine. The maximum number of routines contained in a program shall be limited only by memory.
- 3.13.33. Programming. It shall be possible to program ladder rungs with the following restrictions. Within a single ladder routine series instruction count limited only by user memory, branch extensions limited only by user memory, branch nesting to 6 levels or more.
- 3.13.34. Contact editing. The capability shall exist to change the state of a contact from normally open to normally closed, add instructions, and change addresses, without deleting and reprogramming the entire rung.
- 3.13.35. Deletion commands. A single program command or instruction shall enable deletion of an individual ladder diagram rung from memory, without deleting the rung contact by contact.
- 3.13.36. Deletion safeguard. A two-part command shall be used to delete all relay ladder rungs from memory, providing a safeguard wherein the operator must verify their intentions before erasing the entire program.
- 3.13.37. Rung comments. The system shall have the capability to enter rung comments above ladder logic rungs. The capability shall be provided to enter comments at the same time the ladder logic is entered.
- 3.13.38. Rung editing. The capability shall exist for adding, removing, or modifying ladder logic rungs during program execution. When changes to ladder logic are made or new logic rungs are added, it shall be possible to test the edits of such rungs before removal of the prior logic rung is executed.
 - 3.13.38.1. Relay ladder logic rungs. It shall be possible to insert relay ladder logic rungs anywhere in the program even between existing rungs.
 - 3.13.38.2. Ladder logic editing. The PLC System shall have the capability to remove an entire logic rung into an edit buffer where individual parameters may be easily altered.
- 3.13.39. Controller variables. Variables within the controller shall be referenced as unique, default, or user defined tags.
- 3.13.40. Tags. The ability to program control logic via tags of the programmable controller shall exist. Tags shall be created off-line, on-line in program mode, and at the same time the ladder logic is entered.
 - 3.13.40.1. Availability. Tags shall be available to all tasks in the controller (controller scoped) or limited in scope to the routines within a single program (program scoped) as defined by the user.
 - 3.13.40.2. Alias. Any tag shall have the ability to be aliased by another tag that is defined and has meaning to the user.

- 3.13.40.3. Tag naming convention. Tag naming convention shall adhere to IEC 61131-2.
- 3.13.40.4. Description. The system shall have the capability to store a description for each tag.
- 3.13.41. User-defined data structures. The capability shall exist to organize data in the form of User-Defined Data Structures. All aforementioned data types, as well as others, shall be used in such structures along with embedded arrays and other User-Defined Data Structures.
- 3.13.42. Array configuration. Arrays shall be configurable with one, two, or three dimensions.
 - 3.13.42.1. Value arrays. Value arrays shall be limited in size only by the amount of available memory.
 - 3.13.42.2. Addressing index. The CPU shall support indexed addressing of array elements.
 - 3.13.42.3. Array element manipulation instructions. Array element manipulation instructions such as high speed "array copy" and "array fill", "array to array" move, "element to array" move, "array to element" move and "first in - first out" shall be supported by the system. The four-function math instructions and instructions for performing "logical OR", "logical AND", "exclusive OR", and comparison instructions such as "less than", "greater than", and "equal to" shall be included within the system. All instructions shall execute on either single words or arrays.
- 3.13.43. Status of channels. For any module specifically associated with the programmable controller, it shall be possible to query the current status of all channels through controller-scoped tags without any programming.
- 3.13.44. Master system clock. The programmable controller shall provide a master system clock that shall allow synchronization of all axes in the chassis local to the controller.
- 3.13.45. User applications. The controller shall organize user applications as tasks that can be specified as continuous or periodic.
- 3.13.46. Clock/calendar. A clock/calendar feature shall be included within the CPU with access from the programming terminal, user program, or message generation.
- 3.13.47. Latch functions. Latch functions shall be internal and programmable.
- 3.13.48. Software timers and counters. The system shall have the capability to address software timers and software counters in any combination and quantity up to the limit of available memory. The CPU shall handle all management of these instructions into memory. Instructions shall permit programming timers in the on or off delay modes. Timer programming shall also include the capability to interrupt timing without resetting the timers. Counters shall be programmable using up-increment and down-increment.
- 3.13.49. Timer instructions. Timer instructions shall include selectable time bases in

increments of 1 second, 10 ms, and 1 ms with at least 10 ms accuracy. The timing range of each timer shall be from 0 to 2,147,483,648 increments. It shall be possible to program and display separately the timer's preset and accumulated values.

- 3.13.50. Signed integer format. The PLC processor shall use a double integer format ranging from -2,147,483,648 to +2,147,483,647 for data storage of the counter preset and accumulated values.
- 3.13.51. Data storage. The PLC processor shall store data in the following formats:
- 3.13.51.1. Boolean Values (0 or 1).
 - 3.13.51.2. Short Integer Numbers ranging from -128 to +127.
 - 3.13.51.3. Signed Integer Numbers ranging from -32,768 to +32,767.
 - 3.13.51.4. Double Integer Numbers ranging from -2,147,483,648 to +2,147,483,647.
 - 3.13.51.5. Floating Point Numbers consisting of eight significant digits. For numbers larger than eight digits, the CPU shall convert the number into exponential form with a range of $\pm 1.175494 \text{ E } -38$ to $\pm 3.402824 \text{ E } +38$.
 - 3.13.51.6. Decimal Numbers ranging from 0 to 9,999.
- 3.13.52. Math functions. The processor shall have support for integer and floating point signed math functions consisting of addition, subtraction, multiplication, division, and square root.
- 3.13.53. Multiple channels. When using modules such as analog where multiple channels are terminated on one module, it shall be possible to transfer the current status of all channels to the CPU upon execution of one program instruction. This instruction shall be bi-directional to include data transfer from the CPU to the module or from the module to the CPU.
- 3.13.54. Grouping contiguous 16-bit data words. Instructions shall be provided for grouping contiguous 16-bit data words into a file. The system shall address up to 1,000 files with up to 1,000 words per file. File manipulation instructions such as high-speed "file copy" and "file fill", "file to file" move, "element to file" move, "file to element" move, and "first in - first out" shall be supported by the system. The four function math instructions and instructions for performing "logical OR", "logical AND", "exclusive OR", and comparison instructions such as "less than", "greater than", and "equal to" shall be included within the system. All instructions shall execute on either single words or files.
- 3.13.55. Asynchronous and synchronous. The processor shall contain instructions, which shall construct asynchronous and synchronous 16-bit word shift registers. Additional instructions shall be provided to construct synchronous bit shift registers.
- 3.13.56. Jump instruction. The processor shall have a jump instruction that shall allow the programmer to jump over portions of the user program to a portion marked by a matching label instruction.

- 3.13.57. Management of all data types. The CPU shall automatically manage all data types. For example, if a word stored in the integer section of memory is transferred into the floating-point section, the CPU shall convert the integer value into floating-point prior to executing the transfer.
- 3.13.58. Subroutine section. In applications requiring repeatable logic rungs, the capability shall exist to place such rungs in a subroutine section. Instructions, which call the subroutine and return to the main program, shall be included within the system. The capability shall exist to program several subroutines and define each subroutine by a unique program file designator. The processor shall support nesting of subroutines a minimum of seven levels deep. The program format as displayed on the CRT/LCD shall clearly define the main program and all subroutines. The capability shall exist to pass selected values (parameters) to a subroutine before its execution, enabling the subroutine to perform mathematical or logical operations on the data and return the results to the main program upon completion. These subroutines shall be accessed by jump-to-subroutine instructions.
- 3.13.59. Program format. The program format shall display all instructions on a CRT/LCD programming panel with appropriate mnemonics to define all data entered by the programmer. The system shall be capable of providing a "HELP" instruction which, when called by the programmer, shall display on the CRT a list of instructions and all data and keystrokes required to enter an instruction into the system memory.
- 3.13.60. Displayed system memory. At the request of the programmer, data contained in system memory shall be displayed on the CRT/LCD programming panel. This monitoring feature shall be provided for input/output status, timer/counter data, files, and system status. Ladder logic rungs shall be displayed on the CRT with rung numbers in sequential order. However, the programmer shall have the option of selecting and displaying logic rungs noncontiguously. Sequential function charts shall be displayed on the CRT/LCD. Structured text shall be displayed on the CRT.
- 3.1 3.61. Addressing comments. The system shall have the capability to enter address comments and symbols. These entities shall have the capability to be entered at the same time the ladder logic is entered.
- 3.13.62. Manually setting. The capability shall exist to manually set (force) either ON or OFF all hardwired input or output. Removal of these forced I/O points shall be either individually or totally through selected keystrokes. The programming terminal shall be able to display forced I/O points.
- 3.13.63. Fault recovery. A means to program a fault recovery routine shall exist. When a major system fault occurs in the system, the fault recovery routine shall be executed and then the system shall determine if the fault has been eliminated. If the fault is eliminated, program execution shall resume. If the fault still exists, the system shall shut down. A user shall have the option to either resume operation or to shut down upon fault detection.
- 3.13.64. Fault routine. The capability shall exist for each program to have its own fault routine for program fault recovery and each having the same features as the controller based fault routine.
- 3.13.65. Interrupt routine. An interrupt routine shall be programmable such that the routine shall be an instruction and shall be supported to incorporate closed

loop control systems. The “proportional”, “integral”, and “derivative” elements shall be accessible to the user in order to tune a closed loop system. This instruction shall fully support floating-point math. An interrupt routine shall be programmable such that the routine shall be executed regularly. The interval at which the routine is executed shall be user-specified in the range of 1 to 65,535 ms. An interrupt routine shall be programmable such that the routines shall be executed based upon the input condition of one of the discrete hardware inputs in the processor chassis. The routine shall be executed within 2 ms of the detection of the input signal.

- 3.13.66. Software instruction set addressing. The CPU shall support indexed and indirect addressing of inputs and outputs, along with all data table words (integer, binary, floating point, timers, and counters) for the software instruction set.
- 3.13.67. Symbols. The ability to program control logic via symbols from the global database of the PLC processor shall exist.
- 3.13.68. Control program instruction. An instruction shall be available to give the control program diagnostic information, state control, and sequencing of a process simultaneously, while allowing the capability of user-friendly state programming techniques.
- 3.13.69. Diagnostic instructions. The system shall support both bit and word level diagnostic instructions.
- 3.13.70. Function block programming. The processor shall be able to edit, build, and execute logically constructed function block routine. These function blocks shall be executed either selectively, based upon application logic (transitions), or simultaneously. The ability to “zoom” in on a given routine shall be inherent to allow the user to quickly diagnose their application program. The overall effect of the function chart programming shall be to provide a more efficient flow of the user’s application program.
- 3.13.71. Event detection programming. To facilitate conditional event detection programming, output instructions shall include “one shot” instructions, which shall provide the capability of being triggered on either low-to-high (rising) or high-to-low (falling) rung conditions.
- 3.13.72. Debugging. To facilitate debugging, an “always false” instruction shall temporarily inhibit the execution of control logic.
- 3.13.73. Master control reset. The processor shall support Master Control Reset (Relay) type functionality to selectively disable sections of logic.
- 3.13.74. Trigonometric instructions. Trigonometric instructions supported shall include Sine, Cosine, Tangent, Inverse Sine, Inverse Cosine, and Inverse Tangent. These instructions shall fully support floating-point math.
- 3.13.75. Floating-point instructions. Additional floating-point instructions supported shall include Log 10, Natural Log, and Exponential.
- 3.13.76. Calculations. It shall be possible to complete complex, combined calculations in a single instruction, such as flow totaling or equations of the format $((A + (B - C) * D)) / E$.

- 3.13.77. File function instructions. File function instructions supported shall include Sort, Average, Square Root, and Standard Deviation.
- 3.13.78. FOR-NEXT loop. The processor shall include direct support of FOR-NEXT loop constructions.
- 3.13.79. ASCII string manipulation instructions. The processor instruction set shall provide support for a variety of ASCII string manipulation instructions such as search, concatenation, extraction, compare, and to/from integer conversion.
- 3.13.80. Control logic functions. The processor shall support control logic functions providing ASCII port control such as read, write, handshake line control, and buffer examination.
- 3.13.81. Configuration. The capability shall exist to configure control programs that consist of hybrid control functions combining both relay ladder logic, sequential function chart operations, and structured text operations.
- 3.13.82. Communication. The programmable controller shall communicate with remote I/O racks or other PLCs via fiber optic cable by inserting fiber optic converters into the links. The fiber link shall support distances between converters up to 6500 cable feet. Redundant fiber optic cabling shall be an option.
- 3.13.83. Program Storage and Upload. The capability shall exist for the PLC program to be stored in a text format on a PC based computer. The saved text file shall be directly modifiable and then uploaded to the PLC processor.
- 3.14. Diagnostics and state control. The programmable controller system shall be capable of supporting the diagnostic functions indicated.
 - 3.14.1. Diagnostic instruction. A diagnostic instruction in the PLC processor shall be capable of executing level 1, level 2, or level 3 diagnostics. Level 1 diagnostics shall use control logic for control with control logic fault detection logic setting fault bits that are monitored by the instruction for diagnostic message generation only. Level 2 diagnostics shall use control logic to control outputs, but the instruction shall monitor inputs and conditions to detect faults and generate a diagnostic message. In level 3 diagnostics, the instruction shall control outputs, monitor inputs for state control, perform diagnostic detection, and generate a diagnostic message.
 - 3.14.2. Diagnostic messages. Diagnostic messages shall be assembled automatically using text from the PLC processor documentation such as address comments, symbols, step names, instruction comments, processor name, and other accessible PLC parameters. These fragments shall be user configurable in terms of size and usage. These automatic messages shall not require pre-storage by the user as they are dynamically assembled and generated.
 - 3.14.3. Network multiple PLC processors. It shall be possible to network multiple PLC processors, each of which shall report diagnostic information to a common terminal.
 - 3.14.4. Diagnostic messages. The system shall provide the following types of diagnostic messages:
 - 3.14.4.1. Status messages.
 - 3.14.4.2. Error messages.

- 3.14.4.3. Time-out messages.
- 3.14.4.4. Warning time-out messages.
- 3.14.4.5. One valid exit message.
- 3.14.4.6. Mismatch message.

4. INDUSTRIAL ETHERNET (IE) ENCLOSURES

4 Industrial Ethernet Switch Requirements

4.1 Physical

4.1.1 Shall be DIN Rail Mountable

4.1.2 Shall support dual sources of 24 VDC power

4.1.3 The switch shall be modular and offer different size racks and various media modules

4.1.4 The following rack sizes shall be offered:

4.1.4.1 2-slot — can hold two interface modules — up to 8 interfaces

4.1.4.2 4-slot — can hold four interface modules — up to 16 interfaces

4.1.4.3 6-slot — can hold six interface modules — up to 24 interfaces

4.1.5 The following types of interfaces shall be offered with the modules:

4.1.5.1 100BASE-FL with ST connection

4.1.5.1.1 These ports shall support full and half duplex operation

4.1.5.2 10BASE-T/100BASE-TX with RJ45 connection

4.1.5.2.1 These ports shall support:

4.1.5.2.1.1 Auto negotiation

4.1.5.2.1.2 Auto polarity

4.1.5.2.1.3 100 Mbit/s half duplex

4.1.5.2.1.4 100 Mbits/s full duplex

4.1.5.2.1.5 10 Mbit/s half duplex

4.1.5.2.1.6 10 Mbits/s full duplex

4.1.5.3 100BASE-FX with MTRJ connection

4.1.5.3.1 These ports shall support full duplex

4.1.6 Interface modules shall be offered to contain all of one kind or a combination of interface types (e.g. 2 100BASE-FX and 2 twisted pair connections)

4.1.7 The following indicators shall be provided on the switch

4.1.7.1 Internal power supply voltage present

4.1.7.2 Supply voltage 1 present or low

4.1.7.3 Supply voltage 2 present or low

4.1.7.4 Fault indicating there is some error

4.1.8 The following indicators shall be provided on each interface module:

4.1.8.1 Link status

4.1.8.2 Full Duplex indication

4.1.8.3 10/100 Mbits/s indication

4.1.8.4 Auto-negotiate setting indication

4.2 Environmental

4.2.1 Operating temperature shall be 0-60 degrees Celsius

4.3 Functional

- 4.3.1 Network Topology — Any line, star or ring topology shall be supported
- 4.3.2 Management
 - 4.3.2.1 Management via SNMP Version 1/2/3 shall be supported
 - 4.3.2.2 Web based management shall be supported
 - 4.3.2.3 Management via a direct serial terminal connection
- 4.3.3 Multicast shall be supported
 - 4.3.3.1 IGMP v1, v2
 - 4.3.3.2 IGMP query
- 4.3.4 Virtual Local Area Networks (VLANs) as defined in IEEE 802.1Q shall be supported
- 4.3.5 Port Mirroring shall be supported
- 4.3.6 Auto-negotiation as defined in IEEE 802.3u shall be supported
- 4.3.7 Quality of Service (QOS) shall be supported
- 4.3.8 Port Prioritization as defined in IEEE 802.1 D/p shall be supported
- 4.3.9 Flow Control as defined in IEEE 802.3x shall be supported
- 4.3.10 Simple Network Time Protocol (SNTP) shall be supported
- 4.3.11 Rapid Spanning Tree Protocol (RSTP) as defined in IEEE 802.1w shall be supported
- 4.3.12 Precision Time Protocol (PTP) as defined in IEEE 1588 shall be supported
- 4.3.13 Bootstrap Protocol (BOOTP) shall be supported
- 4.3.14 Dynamic Host Configuration Protocol (DHCP) shall be supported
- 4.3.15 Broadcast Limiting shall be supported
- 4.3.16 The switch shall have the capability of “learning” and storing up to 4000 source addresses.
- 4.3.17 Shall support Dual Homing where there is a primary and secondary connection. Automatic failover to the secondary connection shall occur upon “loss of link” status on the primary connection.

5. CONTRACTOR GENERAL REQUIREMENTS

- 5.1 The Contractor shall assume single source responsibility for system assembly. An assembled system may include enclosures, mounting and wiring of relays, transformers, and disconnecting means, interface cables and connectors or other control devices as specified by customer-supplied documentation.
- 5.2 The Contractor shall have the capability to supply an enclosure with special paint and graphic displays. IE enclosures shall be offered in two styles - Stainless steel and Zinc coated steel.
- 5.3 The Contractor shall wire all Programmable Controller inputs and outputs to customer-specified terminal blocks.
- 5.4 The assembled system shall include fuse blocks that meets the Government size requirement that will be provided within 30 days after contract award.
- 5.5 Within the enclosures all I/O racks, processor racks, and power supplies shall be grounded to meet the specifications.
- 5.6 All pushbuttons, switches and other operator devices must be UL listed and/or CSA approved, and sufficiently large and durable to provide dependable, long life operation.
- 5.7 All cables (with associated plugs, connectors and receptacles) requiring user field installation, shall be designed for commercial use to withstand an industrial environment.
- 5.8 The Contractor shall submit preliminary drawings of the complete assembled system for approval by the Government.
- 5.9 The Government shall conditionally approve or disapprove the drawings within 15 days after receipt. Prior to approval of the preliminary drawings, the acquisition of materials or components for, or the commencement of production of, the MCS is at the sole risk of the contractor.
- 5.10 All drawings shall include page, sheet, and line numbers.
- 5.11 The first page of all drawings and schematics shall be a cover sheet consisting of a Bill of Material, purchase order number, Contractor's job number, user's name, location, application, and shipping address.
- 5.12 The drawings shall include a mechanical layout detailing the overall external dimensions of the enclosure. The drawings shall include such pertinent information as location of door handles, windows, lifting lugs, and enclosure mounted items such as tachometer or current meters, cooling fans, etc.
- 5.13 The Contractor shall provide documentation detailing the mounting of the processor, I/O racks, disconnect switch, fuse blocks, wireways, etc. All materials shall be labeled to provide easy cross-reference to the Bill of Material listing.
- 5.14 Electrical prints detailing all hardwiring, done by the Contractor, to devices such as relays, disconnect switches, fuse blocks, etc. shall be provided with individual wire numbers and relay contact cross-reference designations.
- 5.15 Sections describing inputs shall designate input modules by name, rack, module, and

terminal location.

- 5.16 The last sheet in the set shall be for terminal block designations each containing their individual terminal numbers.
- 5.17 At the time the equipment is shipped, one (1) reproducible copy of each drawing mentioned above shall be provided with the equipment.

6. Environmental Specifications

- 6.1 All material within the enclosures must be able to meet the following environmental requirements:
 - 6.1.1 Shock specifications must meet MIL-STD-901D, Grade A.
 - 6.1.2 Vibration specifications must meet MIL-STD-167 (Ships).
 - 6.1.3 RFI specifications must meet current version of MIL-STD-461.
 - 6.1.4 All material must be able to operate in 130⁰F ambient environments.
 - 6.1.5 All material must be able to operate with external humidity ranging from 5% to 95% non-condensing.
 - 6.1.6 All enclosures designated as “submersible” shall conform to MIL-STD-108E, Notice 1. All enclosures designated as “drip-proof” shall conform to NEMA 4.
 - 6.1.7 All fiber optic connectors shall conform to MIL-C-83522/16B.
 - 6.1.8 All wire markers/labels shall conform to MIL-I-23053.
 - 6.1.9 All components used for enclosure penetration and sealing (i.e. strain relief, stuffing tubes etc.) shall conform to MIL-S-19622F.
 - 6.1.10 All CAT-5 copper cable shall conform to MIL-DTL-24643B.
 - 6.1.11 All fiber optic cable shall conform to MIL-PRF-85045F and MIL-PRF-49291 C.
 - 6.1.12 All internal enclosure wire termination, routing, splicing, banding, securing and other electrical/electronic enclosure techniques shall conform to the standards of Electronic Installation and Maintenance Book (EIMB), NAVSEA 0967-LP-O00-0110.
- 6.2 The contractor shall provide environmental certification.

7. Requirements Acquisition

- 7.1. The specific quantity of Machinery Control Systems (MCS) that will be required for installation aboard US Navy ships during the contract period are not known. Therefore, this procurement will be made through a "requirements contract." It is estimated that 150 enclosures (various types/sizes) will be required during each contract year for a total of five years. The Contract Line Items (CLINs) included in Section B are organized so that CLINS 0001 through 0006 establish the price of components ordered during the first contract year, CLINs 0007 through 0012 establish the price of components ordered during the second contract year, CLINs 0013 through 0018 establish the price of components ordered during the third contract year, CLINs 0019 through 0024 establish the price of components ordered during the fourth contract year, and CLINs 0025 through 0030 establish the price of components ordered during the fifth contract year. Similarly, CLINs 0032 and 0033 have sub-line-items (SLINs) that establish pricing for each of the contract years. Each SLIN includes an estimated quantity to be procured, based on the assumptions stated above. Proposals should be based on those estimated quantities. However, contractors should understand that the actual number of MCS enclosures, and the actual number of each of the components ordered, will be based on the actual requirements of NAVSSES Code 91 during the contract period.
- 7.2. Although enclosures are typically procured as a complete MCS system for a ship, pricing will be on the component level rather than at the system level. This is because the actual components required for a complete MCS system varies from vessel to vessel. A typical MCS system would include between 50 and 75 enclosures. Attachments to this Procurement Specification include an example of the list of components that would be required for a particular MCS system (in this case, the MCS system for CVN 75). There may be infrequent occasions when a small number of enclosures (10 or less) are required. See Clauses 52.216-19 and 52.216-19 in Section I of this Solicitation with respect to ordering limitations.
- 7.3. The quantities specified are estimates only and will not necessarily be purchased. Refer to Clause 52.216-21 in Section I of this Solicitation for further information.

8. SPARE PARTS

For each MCS system, a spare parts list will be developed based the Mean Time Between Failure (MTBF) of each component. The life expectancy of each MCS shall be twenty years. Sparing recommendations (component level) are reflected in the estimated quantities of CLINs 0003, 0006, 0009, 00012, 0015, 0018, 0021, 0024, 0027 and 0030. Spare parts to support component level maintenance and repair should also be provided.

9. TECHNICAL SUPPORT

- 9.1 The Contractor shall be capable of providing support from home office, NSWCCD, and aboard ship. Personnel must possess knowledge of programming, hardware, and installation of the MCS systems for the length of this contract.
- 9.2 Engineering support will be requested on an as-needed basis and can range from one day to four months. This support may be required in non-consecutive days and may be spread out over the entire performance period of the contract.
- 9.4 Field services representatives shall provide miscellaneous material such as fuses, diodes, connectors, etc. in support of on-site service of MCS system.

10. TECHNICAL DOCUMENTATION

- 10.1. The Contractor shall provide a detailed assembly drawing for each enclosure.
- 10.2. The Contractor shall provide all required software necessary to operate system.
- 10.3. The Contractor may also provide software that is not mandatory for operation, but enhances system performance.

11. ATTACHMENTS

- 11.1 Shipset Example: CVN75 I/O Box (PLC) Enclosure List (expected to be part of contract year 1 procurement)
- 11.2 Shipset Example: CVN75 Ethernet Switch (IE) Enclosure List (expected to be part of contract year 1 procurement)

TYPICAL MCS ENCLOSURE LIST FOR CVNS

Box No.	Box Size	Type	Slot 0	Slot 1	Slot 2	Slot 3	TB1 Slot 4	TB2 Slot 5	TB3 Slot 6	TB4 Slot 7	TB5 Slot 8	TB6 Slot 9	TB7 Slot 10	TB8 Slot 11	TB9 Slot 12	TB10 Slot 13
1.1	24x24x8	SUB	ENET	ENET	PM	PLC	IAN	AR3	ACN	AR3	AVN	AR3				
1.2	24x24x8	SUB	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
1.3	24x24x8	SUB	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
1.4	24x24x8	SUB	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
1.5	24x24x8	SUB	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
2.1	24x24x10	D-H	ENET	ENET	PM	PLC	AOC	IAN	QKW	IAI	ACN	AR3				
3.1	24x24x10	D-H	ENET	ENET	PM	PLC	IAN	IAN	IAN	IAN		AR3				
3.2	24x24x10	D-H	ENET		PM		IAI	ACN		QK6						
3.3	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
3.4	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	QANM				
3.5	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
3.6	24x24x10	D-H	ENET		PM		ACN	ACN	IDN	ACN	IDN					
3.7	24x24x10	D-H	ENET		PM		IAI	QK6	ACN	ACN	IDN					
3.8	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	IDN				
3.9	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	IAN	IAN					
3.10	24x24x10	D-H	ENET		PM		IAN	IAN	QAN	QAN						
3.11	24x24x8	D-H	ENET		PM		IAN	IAN	IAN	IAN	IAN					
3.12	24x24x8	D-H	ENET		PM		IDN	ACN	ACN							
3.13	24x24x8	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
4.1	24x24x10	D-H	ENET	ENET	PM	PLC	IAI					AR3				
4.2	30x36x8	D-H	ENET		PM		QKX	ISN	QDN	ISN	QDN	ISN	QDN	ISN	QDN	
4.3	24x24x10	D-H	ENET		PM		IAI									
4.4	24x24x10	D-H	ENET		PM		IAN	ACN	IAI	AR3						
4.5	24x24x10	D-H	ENET		PM		IAI	IAI		ACN						
4.6	24x24x10	D-H	ENET		PM			ISN	QDN							
5.1	24x24x8	D-R	ENET	ENET	PM	PLC	AR3	AR3	AR3	AR3	AR3	ACN				
5.2	24X24X8	D-R	ENET	ENET	PM	PLC	IAN	IAN	IAI	QKW	QKW	IAI				
5.3	24X24X8	D-R	ENET		PM		IAI		QKW	QKW	IAI					

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5.4	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.5	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.6	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.7	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.8	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.9	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.10	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.11	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.12	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
5.13	RKMTD	RAC K	ENET	PM	ISN	ISN	ISN	QDN32	QDN32							
6.1	24x24x10	D-H	ENET	ENET	PM	PLC	IAI	IAI		ISN	QDN	AR3				
6.2	24x24x8	D-H	ENET		PM		IAI	IAI		ACN	AR3	IAN				
7.1	24x24x10	D-H	ENET	ENET	PM	PLC	IAN	QAN	QKX	ACN	ACN	AR3				
7.2	24x24x10	D-H	ENET		PM		IAN	ACN	QAN	QKX						
7.3	24x24x8	SUB	ENET		PM		ACN	ACN	IDN		AOC					
8.1	24x24x10	D-H	ENET	ENET	PM	PLC		ISN	QDN	IAI		AR3				
8.2	24x24x10	D-H	ENET		PM		IAI			ACN		AR3				
9.1	24x24x10	D-H	ENET	ENET	PM	PLC	QKW	AOC	ACN	IAN	IAI	AR3				
9.2	24x24x10	D-H	ENET		PM		IAI	IAI		ACN	ACN	AR3				
10.1	24x24x8	D-H	ENET	ENET	PM	PLC	IAN	IAN	QAN	QAN	QKW	AR3				
10.2	24x24x8	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
10.3	24x24x8	D-H	ENET		PM		IAN	IAN	IAN	QAN	IAN					
10.4	24x24x8	D-H	ENET		PM		IAN	IAN	QAN	QAN						

TYPICAL MCS ENCLOSURE LIST FOR CVNS

Box No.	Box Size	Type	Slot 0	Slot 1	Slot 2	Slot 3	TB1 Slot 4	TB2 Slot 5	TB3 Slot 6	TB4 Slot 7	TB5 Slot 8	TB6 Slot 9	TB7 Slot 10	TB8 Slot 11	TB9 Slot 12	TB10 Slot 13
10.5	24x24x8	D-H	ENET		PM		IAN	IAN	IAN	ACN	IDN					
10.6	24x24x10	D-H	ENET		PM		IAN	IAN	QAN	QAN	ACN					
10.7	24x24x8	SUB	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
10.8	24x24x8	SUB	ENET		PM		IAI	QK6	QK6	ACN	ACN	IDN				
10.9	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN	QAN				
10.10	24x24x10	D-H	ENET		PM		ACN	ACN	IDN	ACN	ACN					
10.11	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	IAN	IAN	IAN				
10.12	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QANM	IDN				
10.13	24x24x10	D-H	ENET		PM		IAN	IAN	IAN	QAN	QAN					
10.14	24x24x8	D-H	ENET		PM		AVN	ACN	IAN	AR3	AR3	AR3				
10.15	24x24x8	D-H	ENET		PM		ACN	AR3	ACN	IAN	IAI					
11.1	30x36x8	D-H	ENET	ENET	PM	PLC	ACN	AR3	IAI	ISN	QDN	AR3				
11.2	24x24x8	D-H	ENET				ACN	IAI	AR3		AR3					
12.1	24x24x10	D-H	ENET	ENET	PM	PLC	ISN	QDN	ISN	QDN	ISN	QDN				
12.2	24x24x10	D-H	ENET		PM		QKW	QKW	QKW			AR3				

Typical MCS Enclosure List for CVNs

			Primary	Switch A							Switch B						
IESW	Box Size	Type	Power	Type	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Type	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
IESW NO 1	16x16x10	SUB	24V	4 Slot	4_Cat5	2_Cat5/ 2_FO	4_Cat5	4_Cat5									
IESW NO 2	16x16x10	D-H	24V	2 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO											
IESW NO 3	24x24x10	D-H	24V	6 Slot	4_FO	2_Cat5/ 2_FO	4_Cat5	4_Cat5	4_Cat5	4_Cat5							
IESW NO 4	16x16x10	D-H	24V	4 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO	4_FO	4_Cat5									
IESW NO 5	24x24x10	D-H	24V	4 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO	4_Cat5	4_Cat5			4 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO	4_Cat5	4_Cat5		
IESW NO 6	16x16x10	D-H	24V	2 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO											
IESW NO 7	16x16x10	D-H	24V	4 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO	2_Cat5/ 2_FO	4_Cat5									
IESW NO 8	16x16x10	D-H	24V	2 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO											
IESW NO 9	16x16x10	D-H	24V	2 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO											
IESW NO 10	24x24x10	D-H	24V	6 Slot	4_FO	2_Cat5/ 2_FO	4_Cat5	4_Cat5	4_Cat5	4_Cat5							
IESW NO 11	16x16x10	D-H	24V	2 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO											
IESW NO 12	16x16x10	D-H	24V	2 Slot	2_Cat5/ 2_FO	2_Cat5/ 2_FO											

TYPICAL MCS ENCLOSURE COMPONENT SUMMARY FOR CVNs

<i>I/O HARNESS</i>	<i>QTY</i>
<i>ENET</i>	<i>79</i>
<i>PLC</i>	<i>13</i>
<i>PM</i>	<i>65</i>
<i>IAN</i>	<i>88</i>
<i>IAI</i>	<i>25</i>
<i>ISN</i>	<i>39</i>
<i>IDN</i>	<i>10</i>
<i>QAN</i>	<i>48</i>
<i>QKW</i>	<i>10</i>
<i>QKX</i>	<i>3</i>
<i>QK6</i>	<i>4</i>
<i>QDN</i>	<i>14</i>
<i>QDN:32</i>	<i>20</i>
<i>AR3</i>	<i>29</i>
<i>ACN</i>	<i>26</i>
<i>AOC</i>	<i>3</i>
<i>AVN</i>	<i>2</i>
<i>QANM</i>	<i>2</i>

<i>IE MODULE</i>	<i>QTY</i>
<i>2 Slot</i>	<i>6</i>
<i>4 Slot</i>	<i>5</i>
<i>6 Slot</i>	<i>2</i>
<i>4 Cat5</i>	<i>17</i>
<i>2 Cat5/2 FO</i>	<i>24</i>
<i>4 FO</i>	<i>3</i>

<i>I/O & IE BOX</i>	<i>QTY</i>
<i>16x16x10 Hinged</i>	<i>8</i>
<i>16x16x10 Submersible</i>	<i>1</i>
<i>24x24x8 Submersible</i>	<i>8</i>
<i>24x24x8 Removable</i>	<i>3</i>
<i>24x24x8 Hinged Drin-</i>	<i>12</i>
<i>24x24x10 Removable</i>	<i>0</i>
<i>24x24x10 Hinged</i>	<i>34</i>
<i>30x36x8 Hinged Drin-</i>	<i>2</i>
<i>Rack Mounted I/O</i>	<i>12</i>

Notes

- 1 Typical CVN system used as an example consists of 12 PLC Groups.
- 2 PLC Group 5 has 2 PLCs for redundancy, 13 PLCs total
- 3 12 PLC groups account for 66 boxes
- 4 12 IE boxes increase total to 78
- 4_Cat5 = 4 Cat5 connection for slot
- 6 FO = Fiber Optic
- 7 The ENET, PLC and PM modules do not require a harness
- 8 Remaining harness descriptions contained in Section 1.9

Section E - Inspection and Acceptance

CLAUSES INCORPORATED BY REFERENCE

52.246-2	Inspection Of Supplies--Fixed Price	AUG 1996
52.246-16	Responsibility For Supplies	APR 1984
252.246-7000	Material Inspection And Receiving Report	MAR 2003

Section F - Deliveries or Performance

CLAUSES INCORPORATED BY REFERENCE

52.211-17	Delivery of Excess Quantities	SEP 1989
52.242-15	Stop-Work Order	AUG 1989
52.242-17	Government Delay Of Work	APR 1984
52.247-34	F.O.B. Destination	NOV 1991

CLAUSES INCORPORATED BY FULL TEXT

52.211-9 DESIRED AND REQUIRED TIME OF DELIVERY (JUN 1997)

(a) The Government desires delivery to be made according to the following schedule (expressed in terms of number of days after issuance of the applicable delivery order):

DESIRED DELIVERY SCHEDULE

<u>ITEM</u>	<u>DAYS ADO</u>
0001, 0002, 0004, 0005 0007, 0008, 00010, 0011 0013, 0014, 0016, 0017 0019, 0020, 0022, 0023 0025, 0026, 0028, 0029	60
0003, 0006, 0009, 0012 0015, 0018, 0021, 0024, 0027, 0030	30
0031	as required by Form DD1423
0032, 0033, 0034, 0035	to be negotiated in individual orders

If the offeror is unable to meet the desired delivery schedule, it may, without prejudicing evaluation of its offer, propose a delivery schedule below. However, the offeror's proposed delivery schedule must not extend the delivery period beyond the time for delivery in the Government's required delivery schedule as follows:

REQUIRED DELIVERY SCHEDULE

<u>ITEM</u>	<u>DAYS ADO</u>
0001, 0002, 0004, 0005 0007, 0008, 00010, 0011 0013, 0014, 0016, 0017 0019, 0020, 0022, 0023 0025, 0026, 0028, 0029	120
0003, 0006, 0009, 0012 0015, 0018, 0021, 0024, 0027, 0030	60
0031	as required by Form DD1423
0032, 0033, 0034, 0035	to be negotiated in individual orders

Offerors that propose delivery of a quantity under such terms or conditions that delivery will not clearly fall within the applicable required delivery period specified above, will be considered nonresponsive and rejected. If the offeror proposes no other delivery schedule, the desired delivery schedule will apply.

OFFEROR'S PROPOSED DELIVERY SCHEDULE

<u>ITEM</u>	<u>DAYS ADO</u>
0001, 0002, 0004, 0005 0007, 0008, 00010, 0011 0013, 0014, 0016, 0017 0019, 0020, 0022, 0023 0025, 0026, 0028, 0029	_____
0003, 0006, 0009, 0012 0015, 0018, 0021, 0024, 0027, 0030	_____
0031	as required by Form DD1423
0032, 0033, 0034, 0035	to be negotiated in individual orders

(b) Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed or otherwise furnished to the successful offeror results in a binding contract. The Government will mail or otherwise furnish to the offeror an award or notice of award not later than the day the award is dated. Therefore, the offeror shall compute the time available for performance beginning with the actual date of award, rather than

the date the written notice of award is received from the Contracting Officer through the ordinary mails. However, the Government will evaluate an offer that proposes delivery based on the Contractor's date of receipt of the contract or notice of award by adding (1) five calendar days for delivery of the award through the ordinary mails, or (2) one working day if the solicitation states that the contract or notice of award will be transmitted electronically. (The term "working day" excludes weekends and U.S. Federal holidays.) If, as so computed, the offered delivery date is later than the required delivery date, the offer will be considered nonresponsive and rejected.

(End of clause)

Section G - Contract Administration Data

CLAUSES INCORPORATED BY REFERENCE

252.242-7000 Postaward Conference

DEC 1991

CLAUSES INCORPORATED BY FULL TEXT

CAR-G02 SUBMISSION OF INVOICES (FIXED PRICE) (MAR 2004)

- (a) "Invoice" as used in this clause does not include contractor requests for progress payments.
- (b) The contractor shall submit original invoices with copies to the address identified in the solicitation/contract award form (SF 26-Block 10; SF 33-Block 23; SF 1447-Block 14), unless delivery/task orders are applicable, in which case invoices will be segregated by individual order and submitted to the address specified in the order (DD 1155-Block 13 or SF 26-Block 10).
- (c) The use of copies of the Material Inspection and Receiving Report (MIRR), DD Form 250, as an invoice is encouraged. DFARS Appendix F-306 provides instructions for such use. Copies of the MIRR used as an invoice are in addition to the standard distribution stated in DFARS F-401.
- (d) In addition to the requirements of the Prompt Payment clause of this contract, the contractor shall cite on each invoice the contract line item number (CLIN); the contract subline item number (SLIN), if applicable; the accounting classification reference number (ACRN) as identified on the financial accounting data sheets, and the payment terms.
- (e) The contractor shall prepare:
- ☒ a separate invoice for each activity designated to receive the supplies or services.
 - ☐ a consolidated invoice covering all shipments delivered under an individual order.
 - ☐ either of the above.
- (f) If acceptance is at origin, the contractor shall submit the MIRR or other acceptance verification directly to the designated payment office. If acceptance is at destination, the consignee will forward acceptance verification to the designated payment office

(End of clause)

Section H - Special Contract Requirements

CLAUSES INCORPORATED BY FULL TEXT

CAR-H05 PAST PERFORMANCE ASSESSMENT (SYSTEMS OR SHIP REPAIR AND OVERHAUL) (APR 2000)

(a) The contractor, in performing this contract, will be subject to a past performance assessment in accordance with FAR 42.15, the Department of the Navy Contractor Performance Assessment Reporting System (CPARS) Guide (herein referred to as the Navy CPARS Guide), and the CPARS Users Manual in effect on the date of award. All information contained in this assessment may be used, within the limitations of FAR 42.15, by the Government for future source selection in accordance with FAR 15.304 when past performance is an evaluation factor for award. The assessment (herein referred to as the Contractor Performance Assessment Report (CPAR)) will be prepared by government personnel and reviewed by contractor personnel, via on-line, at the CPARS Web Site <http://www.cpars.navy.mil>. The CPAR will be prepared on an annual basis as determined by the Contracting Officer, with interim and final assessments as prescribed by the Navy CPARS guide. The Navy CPARS guide, the CPARS Users Manual and additional CPARS information can be found at the above CPARS Web Site.

(b) Access to the CPAR will require user id/passwords which will be provided to the contractor prior to the initial report due date. Utilizing the user id/passwords, contractor personnel will be able to review the CPAR and will have a 30-calendar-day period in period in which to agree/disagree with the ratings, enter comments, rebut statements or add information on an optional basis. After contractor input or 30 days from the date of government notification of CPAR availability, whichever occurs first, the CPAR will be reviewed by the government. The government will have the option of accepting or modifying the original ratings. The contractor will then be notified when the completed CPAR is posted in the CPARS web site. The CPAR is not subject to the Disputes clause of the contract, nor is it subject to appeal beyond the review and comment procedure described above and in the Navy CPARS Guide.

(c) The contractor will be assessed on the following elements and sub-elements:

(1) Quality of Product or Service: This element is comprised of an overall rating and six sub-elements. The overall rating at the element level is the government's integrated assessment as to what most accurately depicts the contractor's technical performance or progress towards meeting requirements. It is not a predetermined roll-up of the sub-element assessments.

(A) Product Performance: The contractor's achieved product performance relative to performance parameters required by the contract.

(B) Systems Engineering: The contractor's effort to transform operational needs and requirements into an integrated system design solution.

(C) Software Engineering: The contractor's success in meeting contract requirements for software development, modification, or maintenance. As a source of information to support this evaluation, the government may use results from the Software Capability Evaluations (SCEs) (using the Software Engineering Institute's (SEI's) Capability Maturity Model (CMM) as a means of measurement; Software Development Capability Evaluations (SDCEs); or similar software assessments.

(D) Logistics Support/Sustainment: The success of the contractor's performance in accomplishing logistics planning.

(E) Product Assurance: The contractor's success in meeting program quality objectives, e.g., producibility, reliability, maintainability, inspectability, testability, and system safety, and controls over the manufacturing process.

(F) Other Technical Performance: All other technical activity of the contractor critical to successful contract performance. This will include additional assessment aspects that are unique to the contract or that cannot be captured in another sub-element.

(2) Schedule: Contractor's timeliness in completing contract or task order milestones, delivery schedules, and administrative requirements.

(3) Cost Control (Not required for FFP or FFP/EPA): The contractor's effectiveness in forecasting, managing, and controlling contract cost.

(4) Management: This element is comprised of an overall rating and three sub-elements. The government will assess activity critical to successfully executing the contract within one or more of these sub-elements. The overall rating at the element level is the government's integrated assessment as to what most accurately depicts the contractor's performance in managing the contracted effort. It is not a predetermined roll-up of the sub-element assessments.

(A) Management Responsiveness: The contractor's timeliness, completeness and quality of problem identification, corrective action plans, proposal submittals (especially responses to change orders, ECPs, or other undefinitized contract actions), the contractor's history of reasonableness and cooperative behavior, effective business relations, and customer satisfaction.

(B) Subcontract Management: The contractor's success with timely award and management of subcontracts, including whether the contractor met small/small disadvantaged and women-owned business participation goals.

(C) Program Management and Other Management: The extent to which the contractor discharges its responsibility for integration and coordination of all activity needed to execute the contract; identifies and applies resources required to meet schedule requirements; assigns responsibility and tasks/actions required by the contract; and communicates appropriate information to affected program elements in a timely manner. In addition, the contractor's risk management practices will be assessed, especially the ability to identify risks and formulate and implement risk mitigation plans. If applicable, any other areas unique to the contract or that cannot be captured elsewhere under the Management element will be identified and assessed.

(d) The following adjectival ratings and criteria shall be used when assessing all past performance elements:

(1) *Dark Blue (Exceptional)*. Performance meets contractual requirements and exceeds many to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractor were highly effective.

(2) *Purple (Very Good)*. Performance meets contractual requirements and exceeds some to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the contractor were effective.

(3) *Green (Satisfactory)*. Performance meets contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the contractor appear or were satisfactory.

(4) *Yellow (Marginal)*. Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the contractor has not yet identified corrective actions. The contractor's proposed actions appear only marginally effective or were not fully implemented.

(5) *Red (Unsatisfactory)*. Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains serious problem(s) for which the contractor's corrective actions appear or were ineffective.

Section I - Contract Clauses

CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JUL 2004
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-6	Restrictions On Subcontractor Sales To The Government	JUL 1995
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	JUN 2003
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.204-7	Central Contractor Registration	OCT 2003
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	JAN 2005
52.211-5	Material Requirements	AUG 2000
52.215-2	Audit and Records--Negotiation	JUN 1999
52.215-8	Order of Precedence--Uniform Contract Format	OCT 1997
52.215-14	Integrity of Unit Prices	OCT 1997
52.219-8	Utilization of Small Business Concerns	MAY 2004
52.219-9	Small Business Subcontracting Plan	JUL 2005
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.222-19	Child Labor -- Cooperation with Authorities and Remedies	JUN 2004
52.222-20	Walsh-Healey Public Contracts Act	DEC 1996
52.222-21	Prohibition Of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	APR 2002
52.222-35	Equal Opportunity For Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	DEC 2001
52.222-36	Affirmative Action For Workers With Disabilities	JUN 1998
52.222-37	Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, and Other Eligible Veterans	DEC 2001
52.223-5	Pollution Prevention and Right-to-Know Information	AUG 2003
52.223-6	Drug-Free Workplace	MAY 2001
52.227-1	Authorization and Consent	JUL 1995

52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	AUG 1996
52.229-3	Federal, State And Local Taxes	APR 2003
52.232-1	Payments	APR 1984
52.232-8	Discounts For Prompt Payment	FEB 2002
52.232-9	Limitation On Withholding Of Payments	APR 1984
52.232-17	Interest	JUN 1996
52.232-23	Assignment Of Claims	JAN 1986
52.232-25	Prompt Payment	OCT 2003
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration	OCT 2003
52.233-1	Disputes	JUL 2002
52.233-3	Protest After Award	AUG 1996
52.233-4	Applicable Law for Breach of Contract Claim	OCT 2004
52.242-13	Bankruptcy	JUL 1995
52.243-1	Changes--Fixed Price	AUG 1987
52.244-6	Subcontracts for Commercial Items	DEC 2004
52.246-1	Contractor Inspection Requirements	APR 1984
52.246-24	Limitation Of Liability--High-Value Items	FEB 1997
52.249-2	Termination For Convenience Of The Government (Fixed-Price)	MAY 2004
52.249-8	Default (Fixed-Price Supply & Service)	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2004
252.203-7002	Display Of DOD Hotline Poster	DEC 1991
252.204-7000	Disclosure Of Information	DEC 1991
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004	Central Contractor Registration (52.204-7)	NOV 2003
Alt A	Alternate A	
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	MAR 1998
252.219-7003	Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts)	APR 1996
252.219-7011	Notification to Delay Performance	JUN 1998
252.225-7002	Qualifying Country Sources As Subcontractors	APR 2003
252.225-7006	Quarterly Reporting of Actual Contract Performance Outside the United States	JUN 2005
252.225-7012	Preference For Certain Domestic Commodities	JUN 2004

252.226-7001	Utilization of Indian Organizations and Indian-Owned Economic Enterprises, and Native Hawaiian Small Business Concerns	SEP 2004
252.227-7014	Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation	JUN 1995
252.227-7016	Rights in Bid or Proposal Information	JUN 1995
252.227-7019	Validation of Asserted Restrictions--Computer Software	JUN 1995
252.227-7030	Technical Data--Withholding Of Payment	MAR 2000
252.227-7037	Validation of Restrictive Markings on Technical Data	SEP 1999
252.232-7003	Electronic Submission of Payment Requests	JAN 2004
252.232-7010	Levies on Contract Payments	SEP 2005
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts)	MAR 2000
252.247-7023	Transportation of Supplies by Sea	MAY 2002

CLAUSES INCORPORATED BY FULL TEXT

52.216-18 ORDERING. (OCT 1995)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from the date of award through five years after the date of award.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

(End of clause)

52.216-19 ORDER LIMITATIONS. (OCT 1995)

(a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than \$2,500.00, the Government is not obligated to purchase, nor is the

Contractor obligated to furnish, those supplies or services under the contract.

(b) Maximum order. The Contractor is not obligated to honor:

(1) Any order for a single item in excess of \$1,750,000.00

(2) Any order for a combination of items in excess of \$1,750,000.00; or

(3) A series of orders from the same ordering office within 60 days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.

(c) If this is a requirements contract (i.e., includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 10 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

(End of clause)

52.216-21 REQUIREMENTS (OCT 1995)

(a) This is a requirements contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies or services specified in the Schedule are estimates only and are not purchased by this contract. Except as this contract may otherwise provide, if the Government's requirements do not result in orders in the quantities described as "estimated" or "maximum" in the Schedule, that fact shall not constitute the basis for an equitable price adjustment.

(b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. Subject to any limitations in the Order Limitations clause or elsewhere in this contract, the Contractor shall furnish to the Government all supplies or services specified in the Schedule and called for by orders issued in accordance with the Ordering clause. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(c) Except as this contract otherwise provides, the Government shall order from the Contractor all the supplies or services specified in the Schedule that are required to be purchased by the Government activity or activities specified in the Schedule.

(d) The Government is not required to purchase from the Contractor requirements in excess of any limit on total orders under this contract.

(e) If the Government urgently requires delivery of any quantity of an item before the earliest date that delivery may be specified under this contract, and if the Contractor will not accept an order providing for the accelerated delivery, the Government may acquire the urgently required goods or services from another source.

(f) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after the date which is five years after the date of contract award.

(End of clause)

52.222-39 NOTIFICATION OF EMPLOYEE RIGHTS CONCERNING PAYMENT OF UNION DUES OR FEES (DEC 2004)

(a) Definition. As used in this clause--

United States means the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.

(b) Except as provided in paragraph (e) of this clause, during the term of this contract, the Contractor shall post a notice, in the form of a poster, informing employees of their rights concerning union membership and payment of union dues and fees, in conspicuous places in and about all its plants and offices, including all places where notices to employees are customarily posted. The notice shall include the following information (except that the information pertaining to National Labor Relations Board shall not be included in notices posted in the plants or offices of carriers subject to the Railway Labor Act, as amended (45 U.S.C. 151-188)).

Notice to Employees

Under Federal law, employees cannot be required to join a union or maintain membership in a union in order to retain their jobs. Under certain conditions, the law permits a union and an employer to enter into a union-security agreement requiring employees to pay uniform periodic dues and initiation fees. However, employees who are not union members can object to the use of their payments for certain purposes and can only be required to pay their share of union costs relating to collective bargaining, contract administration, and grievance adjustment.

If you do not want to pay that portion of dues or fees used to support activities not related to collective bargaining, contract administration, or grievance adjustment, you are entitled to an

appropriate reduction in your payment. If you believe that you have been required to pay dues or fees used in part to support activities not related to collective bargaining, contract administration, or grievance adjustment, you may be entitled to a refund and to an appropriate reduction in future payments.

For further information concerning your rights, you may wish to contact the National Labor Relations Board (NLRB) either at one of its Regional offices or at the following address or toll free number:

National Labor Relations Board
Division of Information
1099 14th Street, N.W.
Washington, DC 20570
1-866-667-6572
1-866-316-6572 (TTY)

To locate the nearest NLRB office, see NLRB's website at <http://www.nlr.gov>.

(c) The Contractor shall comply with all provisions of Executive Order 13201 of February 17, 2001, and related implementing regulations at 29 CFR part 470, and orders of the Secretary of Labor.

(d) In the event that the Contractor does not comply with any of the requirements set forth in paragraphs (b), (c), or (g), the Secretary may direct that this contract be cancelled, terminated, or suspended in whole or in part, and declare the Contractor ineligible for further Government contracts in accordance with procedures at 29 CFR part 470, Subpart B--Compliance Evaluations, Complaint Investigations and Enforcement Procedures. Such other sanctions or remedies may be imposed as are provided by 29 CFR part 470, which implements Executive Order 13201, or as are otherwise provided by law.

(e) The requirement to post the employee notice in paragraph (b) does not apply to--

(1) Contractors and subcontractors that employ fewer than 15 persons;

(2) Contractor establishments or construction work sites where no union has been formally recognized by the Contractor or certified as the exclusive bargaining representative of the Contractor's employees;

(3) Contractor establishments or construction work sites located in a jurisdiction named in the definition of the United States in which the law of that jurisdiction forbids enforcement of union-security agreements;

(4) Contractor facilities where upon the written request of the Contractor, the Department of Labor Deputy Assistant Secretary for Labor-Management Programs has waived the posting requirements with respect to any of the Contractor's facilities if the Deputy Assistant Secretary finds that the Contractor has demonstrated that--

(i) The facility is in all respects separate and distinct from activities of the Contractor related to the performance of a contract; and

(ii) Such a waiver will not interfere with or impede the effectuation of the Executive order; or

(5) Work outside the United States that does not involve the recruitment or employment of workers within the United States.

(f) The Department of Labor publishes the official employee notice in two variations; one for contractors covered by the Railway Labor Act and a second for all other contractors. The Contractor shall--

(1) Obtain the required employee notice poster from the Division of Interpretations and Standards, Office of Labor-Management Standards, U.S. Department of Labor, 200 Constitution Avenue, NW, Room N-5605, Washington, DC 20210, or from any field office of the Department's Office of Labor-Management Standards or Office of Federal Contract Compliance Programs;

(2) Download a copy of the poster from the Office of Labor-Management Standards website at <http://www.olms.dol.gov>; or

(3) Reproduce and use exact duplicate copies of the Department of Labor's official poster.

(g) The Contractor shall include the substance of this clause in every subcontract or purchase order that exceeds the simplified acquisition threshold, entered into in connection with this contract, unless exempted by the Department of Labor Deputy Assistant Secretary for Labor-Management Programs on account of special circumstances in the national interest under authority of 29 CFR 470.3(c). For indefinite quantity subcontracts, the Contractor shall include the substance of this clause if the value of orders in any calendar year of the subcontract is expected to exceed the simplified acquisition threshold. Pursuant to 29 CFR part 470, Subpart B--Compliance Evaluations, Complaint Investigations and Enforcement Procedures, the Secretary of Labor may direct the Contractor to take such action in the enforcement of these regulations, including the imposition of sanctions for noncompliance with respect to any such subcontract or purchase order. If the Contractor becomes involved in litigation with a subcontractor or vendor, or is threatened with such involvement, as a result of such direction, the Contractor may request the United States, through the Secretary of Labor, to enter into such litigation to protect the interests of the United States.

(End of clause)

52.248-1 VALUE ENGINEERING (FEB 2000)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any net acquisition savings realized from accepted VECP's, in accordance with the incentive sharing rates in paragraph (f) below.

(b) Definitions. "Acquisition savings," as used in this clause, means savings resulting from the application of a VECP to contracts awarded by the same contracting office or its successor for essentially the same unit. Acquisition savings include--

(1) Instant contract savings, which are the net cost reductions on this, the instant contract, and which are equal to the instant unit cost reduction multiplied by the number of instant contract units affected by the VECP, less the Contractor's allowable development and implementation costs;

(2) Concurrent contract savings, which are net reductions in the prices of other contracts that are definitized and ongoing at the time the VECP is accepted; and

(3) Future contract savings, which are the product of the future unit cost reduction multiplied by the number of future contract units in the sharing base. On an instant contract, future contract savings include savings on increases in quantities after VECP acceptance that are due to contract modifications, exercise of options, additional orders, and funding of subsequent year requirements on a multiyear contract.

"Collateral costs," as used in this clause, means agency cost of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contracting office" includes any contracting office that the acquisition is transferred to, such as another branch of the agency or another agency's office that is performing a joint acquisition action.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Future unit cost reduction," as used in this clause, means the instant unit cost reduction adjusted as the Contracting Officer considers necessary for projected learning or changes in quantity during the sharing period. It is calculated at the time the VECP is accepted and applies either (1) throughout the sharing period, unless the Contracting Officer decides that recalculation is

necessary because conditions are significantly different from those previously anticipated or (2) to the calculation of a lump-sum payment, which cannot later be revised.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistics support. The term does not include the normal administrative costs of processing the VECP or any increase in this contract's cost or price resulting from negative instant contract savings.

"Instant contract," as used in this clause, means this contract, under which the VECP is submitted. It does not include increases in quantities after acceptance of the VECP that are due to contract modifications, exercise of options, or additional orders. If this is a multiyear contract, the term does not include quantities funded after VECP acceptance. If this contract is a fixed-price contract with prospective price redetermination, the term refers to the period for which firm prices have been established.

"Instant unit cost reduction" means the amount of the decrease in unit cost of performance (without deducting any Contractor's development or implementation costs) resulting from using the VECP on this, the instant contract. If this is a service contract, the instant unit cost reduction is normally equal to the number of hours per line-item task saved by using the VECP on this contract, multiplied by the appropriate contract labor rate.

"Negative instant contract savings" means the increase in the cost or price of this contract when the acceptance of a VECP results in an excess of the Contractor's allowable development and implementation costs over the product of the instant unit cost reduction multiplied by the number of instant contract units affected.

"Net acquisition savings" means total acquisition savings, including instant, concurrent, and future contract savings, less Government costs.

"Sharing base," as used in this clause, means the number of affected end items on contracts of the contracting office accepting the VECP.

Sharing period, as used in this clause, means the period beginning with acceptance of the first unit incorporating the VECP and ending at a calendar date or event determined by the contracting officer for each VECP.

"Unit," as used in this clause, means the item or task to which the Contracting Officer and the Contractor agree the VECP applies.

"Value engineering change proposal (VECP)" means a proposal that--

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the overall projected cost to the agency without impairing essential functions or characteristics; provided, that it does not involve a change--

(i) In deliverable end item quantities only;

(ii) In research and development (R&D) end items or R&D test quantities that is due solely to results of previous testing under this contract; or

(iii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (8) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and the proposed requirement, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, the effect of the change on the end item's performance, and any pertinent objective test data.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) Identification of the unit to which the VECP applies.

(4) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under the Subcontracts paragraph of this clause, below.

(5) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(6) A prediction of any effects the proposed change would have on collateral costs to the agency.

(7) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(8) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Contracting Officer, unless this contract states otherwise. If this contract is administered by other than the contracting office, the Contractor shall submit a copy of the VECP simultaneously to the Contracting Officer and to the Administrative Contracting Officer.

(e) Government action. (1) The Contracting Officer will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer will notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause and made either before or within a reasonable time after contract performance is completed. Until such a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Contracting Officer.

(f) Sharing rates. If a VECP is accepted, the Contractor shall share in net acquisition savings according to the percentages shown in the table below. The percentage paid the Contractor depends upon (1) this contract's type (fixed-price, incentive, or cost-reimbursement), (2) the sharing arrangement specified in paragraph (a) above (incentive, program requirement, or a combination as delineated in the Schedule), and (3) the source of the savings (the instant contract, or concurrent and future contracts), as follows:

CONTRACTOR'S SHARE OF NET ACQUISITION SAVINGS

(Figures in percent)

Contract Type	Incentive (Voluntary)		Program Requirement (Mandatory)	
	Instant Contract Rate	Concurrent and Future Contract Rate	Instant Contract Rate	Concurrent and Future Contract Rate
Fixed-price (includes fixed-price-award-fee; excludes other fixed-price incentive contracts)	(1) 50	(1) 50	(1) 25	25
Incentive (fixed-price or cost) (other	(2)	(1) 50	(2)	25

than award fee)				
Cost-reimbursement (includes cost-plus-award-fee; excludes other cost-type incentive Contracts)	(3) 25	(3) 25	15	15

(1) The Contracting Officer may increase the Contractor's sharing rate to as high as 75 percent for each VECP.

(2) Same sharing arrangement as the contract's profit or fee adjustment formula.

(3) The Contracting Officer may increase the Contractor's sharing rate to as high as 50 percent for each VECP.

(g) Calculating net acquisition savings.

(1) Acquisition savings are realized when (i) the cost or price is reduced on the instant contract, (ii) reductions are negotiated in concurrent contracts, (iii) future contracts are awarded, or (iv) agreement is reached on a lump-sum payment for future contract savings (see subparagraph (i)(4) below). Net acquisition savings are first realized, and the Contractor shall be paid a share, when Government costs and any negative instant contract savings have been fully offset against acquisition savings.

(2) Except in incentive contracts, Government costs and any price or cost increases resulting from negative instant contract savings shall be offset against acquisition savings each time such savings are realized until they are fully offset. Then, the Contractor's share is calculated by multiplying net acquisition savings by the appropriate Contractor's percentage sharing rate (see paragraph (f) above). Additional Contractor shares of net acquisition savings shall be paid to the Contractor at the time realized.

(3) If this is an incentive contract, recovery of Government costs on the instant contract shall be deferred and offset against concurrent and future contract savings. The Contractor shall share through the contract incentive structure in savings on the instant contract items affected. Any negative instant contract savings shall be added to the target cost or to the target price and ceiling price, and the amount shall be offset against concurrent and future contract savings.

(4) If the Government does not receive and accept all items on which it paid the Contractor's share, the Contractor shall reimburse the Government for the proportionate share of these payments.

(h) Contract adjustment. The modification accepting the VECP (or a subsequent modification issued as soon as possible after any negotiations are completed) shall--

(1) Reduce the contract price or estimated cost by the amount of instant contract savings, unless this is an incentive contract;

(2) When the amount of instant contract savings is negative, increase the contract price, target price and ceiling price, target cost, or estimated cost by that amount;

(3) Specify the Contractor's dollar share per unit on future contracts, or provide the lump-sum payment;

(4) Specify the amount of any Government costs or negative instant contract savings to be offset in determining net acquisition savings realized from concurrent or future contract savings; and

(5) Provide the Contractor's share of any net acquisition savings under the instant contract in accordance with the following:

(i) Fixed-price contracts--add to contract price.

(ii) Cost-reimbursement contracts--add to contract fee.

(i) Concurrent and future contract savings.

(1) Payments of the Contractor's share of concurrent and future contract savings shall be made by a modification to the instant contract in accordance with subparagraph (h)(5) above. For incentive contracts, shares shall be added as a separate firm-fixed-price line item on the instant contract. The Contractor shall maintain records adequate to identify the first delivered unit for 3 years after final payment under this contract.

(2) The Contracting Officer shall calculate the Contractor's share of concurrent contract savings by (i) subtracting from the reduction in price negotiated on the concurrent contract any Government costs or negative instant contract savings not yet offset and (ii) multiplying the result by the Contractor's sharing rate.

(3) The Contracting Officer shall calculate the Contractor's share of future contract savings by (i) multiplying the future unit cost reduction by the number of future contract units scheduled for delivery during the sharing period, (ii) subtracting any Government costs or negative instant contract savings not yet offset, and (iii) multiplying the result by the Contractor's sharing rate.

(4) When the Government wishes and the Contractor agrees, the Contractor's share of future contract savings may be paid in a single lump sum rather than in a series of payments over time as future contracts are awarded. Under this alternate procedure, the future contract savings may be calculated when the VECP is accepted, on the basis of the Contracting Officer's forecast of the number of units that will be delivered during the sharing period. The Contractor's share shall be included in a modification to this contract (see subparagraph (h)(3) above) and shall not be subject to subsequent adjustment.

(5) Alternate no-cost settlement method. When, in accordance with subsection 48.104-4 of the Federal Acquisition Regulation, the Government and the Contractor mutually agree to use the no-cost settlement method, the following applies:

(i) The Contractor will keep all the savings on the instant contract and on its concurrent contracts only.

(ii) The Government will keep all the savings resulting from concurrent contracts placed on other sources, savings from all future contracts, and all collateral savings.

(j) Collateral savings. If a VECP is accepted, the Contracting Officer will increase the instant contract amount, as specified in paragraph (h)(5) of this clause, by a rate from 20 to 100 percent, as determined by the Contracting Officer, of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings will not exceed the contract's firm-fixed-price, target price, target cost, or estimated cost, at the time the VECP is accepted, or \$100,000, whichever is greater. The Contracting Officer will be the sole determiner of the amount of collateral savings.

(k) Relationship to other incentives. Only those benefits of an accepted VECP not rewardable under performance, design-to-cost (production unit cost, operating and support costs, reliability and maintainability), or similar incentives shall be rewarded under this clause. However, the targets of such incentives affected by the VECP shall not be adjusted because of VECP acceptance. If this contract specifies targets but provides no incentive to surpass them, the value engineering sharing shall apply only to the amount of achievement better than target.

(l) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of \$100,000 or more and may include one in subcontracts of lesser value. In calculating any adjustment in this contract's price for instant contract savings (or negative instant contract savings), the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs, and any value engineering incentive payments to a subcontractor, clearly resulting from a VECP accepted by the Government under this contract. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that the payments shall not reduce the Government's share of concurrent or future contract savings or collateral savings.

(m) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering clause of contract , shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

<http://farsite.hill.af.mil/VFAR1.htm>

(End of clause)

CAR-I01 CONTRACTING OFFICER'S REPRESENTATIVE (COR) (JUN 1996) (NSWCCD)

(a) The COR for this contract is:

TO BE DESIGNATED AT TIME OF AWARD

(b) The COR will act as the Contracting Officer's representative for technical matters, providing technical direction and discussion, as necessary, with respect to the specification or statement of work, and monitoring the progress and quality of contractor performance. The COR is not an Administrative Contracting Officer and does not have authority to direct the accomplishment of effort which is beyond the scope of the statement of work in the contract (or delivery/task order).

(c) When, in the opinion of the contractor, the COR requests effort outside the existing scope of the contract (or delivery/task order), the contractor shall promptly notify the contracting officer (or ordering officer) in writing. No action shall be taken by the contractor under such direction until the contracting officer has issued a modification to the contract (or in the case of a delivery/task order, until the ordering officer has issued a modification to the delivery/task order); or until the issue has been otherwise resolved.

CAR-I06 WRITTEN ORDERS (INDEFINITE DELIVERY CONTRACTS) (JUN 1996)(NSWCCD)

Written orders (on DD Form 1155) will contain the following information consistent with the terms of the contract:

- (a) Date of order
- (b) Contract number and order number.
- (c) Item number and description, quantity ordered, unit price and contract price.
- (d) Delivery or performance date.
- (e) Place of delivery or performing (including consignee).
- (f) Packaging, packing, and shipping instructions if any required.
- (g) Accounting and appropriation data.
- (h) Inspection invoicing and payment provisions to the extent not covered in the contract; and any other pertinent information.

CAR-I10 AUTHORIZED CHANGES ONLY BY THE CONTRACTING OFFICER (JUN 1996) (NSWCCD)

- (a) Except as specified in paragraph (b) below, no order, statement, or conduct of Government personnel who visit the Contractor's facilities or in any other manner communicates with Contractor personnel during the performance of this contract shall constitute a change under the "Changes" clause of this contract.
- (b) The Contractor shall not comply with any order, direction or request of Government personnel unless it is issued in writing and signed by the Contracting Officer, or is pursuant to specific authority otherwise included as a part of this contract.
- (c) The Contracting Officer is the only person authorized to approve changes in any of the requirements of this contract and notwithstanding provisions contained elsewhere in this contract, the said authority remains solely the Contracting Officer's. In the event the contractor effects any change at the direction of any person other than the Contracting Officer, the change will be considered to have been made without authority and no adjustment will be made in the contract price to cover any increase in charges incurred as a result thereof. The address and telephone number of the Contracting Officer is:

TO BE DESIGNATED AT TIME OF AWARD

Section J - List of Documents, Exhibits and Other Attachments

LIST OF ATTACHMENTS

Attachment 1 – Contract Data Requirements List (DD1423)

Section K - Representations, Certifications and Other Statements of Offerors

CLAUSES INCORPORATED BY REFERENCE

52.203-11	Certification And Disclosure Regarding Payments To Influence Certain Federal Transactions	APR 1991
52.204-8	Annual Representations and Certifications	JAN 2005
52.222-38	Compliance With Veterans' Employment Reporting Requirements	DEC 2001
52.230-1	Cost Accounting Standards Notices And Certification	JUN 2000
252.209-7001	Disclosure of Ownership or Control by the Government of a Terrorist Country	SEP 2004
252.225-7031	Secondary Arab Boycott Of Israel	JUN 2005

CLAUSES INCORPORATED BY FULL TEXT

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions.

Common parent, as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

Taxpayer Identification Number (TIN), as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

___ TIN:-----

___ TIN has been applied for.

___ TIN is not required because:

___ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

___ Offeror is an agency or instrumentality of a foreign government;

___ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

___ Sole proprietorship;

___ Partnership;

___ Corporate entity (not tax-exempt);

___ Corporate entity (tax-exempt);

___ Government entity (Federal, State, or local);

___ Foreign government;

___ International organization per 26 CFR 1.6049-4;

___ Other-----

(f) Common parent.

___ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

___ Name and TIN of common parent:

Name-----

TIN-----

(End of provision)

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

(a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it () is a women-owned business concern.

(End of provision)

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that-

(i) The Offeror and/or any of its Principals-

(A) Are () are not () presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have () have not (), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are () are not () presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) The Offeror has () has not (), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity

(e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.215-6 PLACE OF PERFORMANCE (OCT 1997)

(a) The offeror or respondent, in the performance of any contract resulting from this solicitation, () intends, () does not intend (check applicable block) to use one or more plants or facilities located at a different address from the address of the offeror or respondent as indicated in this proposal or response to request for information.

(b) If the offeror or respondent checks "intends" in paragraph (a) of this provision, it shall insert in the following spaces the required information:

Place of Performance(Street Address, City, State, County, Zip Code)	Name and Address of Owner and Operator of the Plant or Facility if Other Than Offeror or Respondent

(End of provision)

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 2004)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 334290.

(2) The small business size standard is 750 employees.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it () is, () is not a small business concern.

(2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it () is, () is not a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a women-owned small business concern.

(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a veteran-owned small business concern.

(5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it () is, () is not a service-disabled veteran-owned small business concern.

(6) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, as part of its offer, that--

(i) It () is, () is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It () is, () is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small

business concern or concerns that are participating in the joint venture. (The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:_____.) Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(c) Definitions. As used in this provision--

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a service-disabled veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern," means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern," means a small business concern --

(1) That is at least 51 percent owned by one or more women; in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

- (i) Be punished by imposition of fine, imprisonment, or both;
- (ii) Be subject to administrative remedies, including suspension and debarment; and
- (iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

- (a) () It has, () has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;
- (b) () It has, () has not, filed all required compliance reports; and
- (c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.222-25 AFFIRMATIVE ACTION COMPLIANCE (APR 1984)

The offeror represents that

- (a) [] it has developed and has on file, [] has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or
- (b) [] has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(End of provision)

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (AUG 2003)

(a) Executive Order 13148, of April 21, 2000, Greening the Government through Leadership in Environmental Management, requires submission of this certification as a prerequisite for contract award.

(b) By signing this offer, the offeror certifies that--

(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

() (i) The facility does not manufacture, process, or otherwise use any toxic chemicals listed in 40 CFR 372.65;

() (ii) The facility does not have 10 or more full-time employees as specified in section 313.(b)(1)(A) of EPCRA 42 U.S.C. 11023(b)(1)(A);

() (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

() (iv) The facility does not fall within the following Standard Industrial Classification (SIC) codes or their corresponding North American Industry Classification System sectors:

(A) Major group code 10 (except 1011, 1081, and 1094.

(B) Major group code 12 (except 1241).

(C) Major group codes 20 through 39.

(D) Industry code 4911, 4931, or 4939 (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce).

(E) Industry code 4953 (limited to facilities regulated under the Resource Conservation and Recovery Act, Subtitle C (42 U.S.C. 6921, et seq.), 5169, 5171, or 7389 (limited to facilities primarily engaged in solvent recovery services on a contract or fee basis); or

() (v) The facility is not located within the United States or its outlying areas.

(End of clause)

52.230-7 PROPOSAL DISCLOSURE--COST ACCOUNTING PRACTICE CHANGES (APR 2005)

The offeror shall check ``yes" below if the contract award will result in a required or unilateral change in cost accounting practice, including unilateral changes requested to be desirable changes.

() Yes () No

If the offeror checked ``Yes" above, the offeror shall--

(1) Prepare the price proposal in response to the solicitation using the changed practice for the period of performance for which the practice will be used; and

(2) Submit a description of the changed cost accounting practice to the Contracting Officer and the Cognizant Federal Agency Official as pricing support for the proposal.

(End of provision)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it:

____ (1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

____ (2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

CAR-K01 ELECTRONIC DISTRIBUTION OF CONTRACT DOCUMENTS (NOV 2000)

(a) The Navy Air Force Interface (NAFI) provides World Wide Web access to documents used to support the procurement, contract administration, bill paying, and accounting processes. NAFI is being used by the Naval Surface Warfare Center, Carderock Division to electronically distribute all contract award and contract modification documents, including task and delivery orders. The contractor's copy will be provided in portable document format (pdf) as an attachment to an e-mail that will be sent to the contractor by the NAFI system. A pdf file may be accessed using Adobe Acrobat Reader which is a free software that may be downloaded at <http://www.adobe.com/products/acrobat/readstep.html>.

(b) Offerors must provide the following information that will be used to make electronic distribution for any resultant contract.

Name of Point of

Contact _____

Phone Number for Point of Contact

E-mail Address for Receipt of Electronic Distribution

Section L - Instructions, Conditions and Notices to Bidders

CLAUSES INCORPORATED BY REFERENCE

52.215-1 Instructions to Offerors--Competitive Acquisition JAN 2004
52.232-28 Invitation to Propose Performance-Based Payments MAR 2000

CLAUSES INCORPORATED BY FULL TEXT

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 2003)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--

(a) From the ASSIST database via the Internet at <http://assist.daps.dla.mil>; or

(b) By submitting a request to the--Department of Defense Single Stock Point (DoDSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2179, Facsimile (215) 697-1462.

(End of provision)

52.211-14 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be () DX rated order; (X) DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.

(End of provision)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of one firm fixed price requirements contract resulting from this solicitation.

(End of clause)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from :

Regina M. Shuster, Code 3351
Naval Surface Warfare Center – SSES
5001 S. Broad Street
Philadelphia, PA 19112-1403

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

<http://farsite.hill.af.mil/VAF1.htm>

(End of provision)

CAR-L02 SINGLE AWARD FOR ALL ITEMS (JUN 1996) (NSWCCD)

Due to the interrelationship of supplies and/or services to be provided hereunder, the Government reserves the right to make a single award to the offeror whose offer is considered in

the best interest of the Government, price and other factors considered. Therefore, offerors proposing less than the entire effort specified herein may be determined to be unacceptable.

Section M - Evaluation Factors for Award

EVALUATION OF PROPOSALS

The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, price and other factors considered. The following are the significant evaluation factors that will be used to evaluate offers, listed in descending order of importance:

- (a) **Technical Design Capability** – The offeror shall provide a technical design meeting the technical specifications for the Machinery Control System (MCS) provided in the solicitation. The design should be specific, detailed and contain sufficient information and technical data to enable the Government to make a thorough evaluation and arrive at a sound determination as to whether or not the technical design will meet the needs of the program. Statements that paraphrase the specifications or attest that “standard procedures will be employed” are considered inadequate to demonstrate the offeror’s actual capability to meet the requirements. The offeror’s technical design must address all of the MCS specification requirements and must describe specifically how the product and services meet all specified requirements. Any deviations from the specifications should be noted in the design proposal. The proposal should describe any documentation that will be provided in connection with the MCS. In order to permit proper evaluation of the proposal, an offeror shall submit, at a minimum, detailed drawings of each enclosure type described in the MCS specifications (duplicate engineering drawings are not required if the same type of enclosure is used more than once). Compliance with the following MCS specification requirements are particularly important:
 - (1) **Enclosure Design** – Should comply with Section 2 of the MCS specifications, particularly with the MIL-STD for Shock, Vibration and EMI requirements.
 - (2) **PLC and Industrial Ethernet Enclosure Components** – The hardware proposed, including the I/O chassis and modules, processor, supporting power supplies and terminal blocks, should comply with Sections 3 and 4 of the MCS specifications. These items should be standard, off-the-shelf items that are interchangeable and easily replaced.
 - (3) **System Support Capabilities** – The offeror should provide information on the customer support that it offers for the life of the MCS. Higher technical ratings will be assigned to offerors with a readily available, comprehensive and quick turn-around customer support structure. The offeror should describe the resources that will be available for customer support, including, but not limited to, the following: training to support the system; technical support available during the design and testing of the system; technical support available after the system is installed; and operational, and engineering support for future design requirements and technology refresh.
- (b) **Corporate Experience/Technical Capabilities**– The offeror should provide a narrative describing its experience in designing, manufacturing and assembling MCS enclosures. The offeror should provide information about facilities, equipment and

qualified personnel available to support the design; assembly and customer support for MCS system components and assembled systems.

- (c) Past Performance –Offerors should provide the following information for up to five (5) contracts or subcontracts that are currently active or that the offeror has completed within the last three years in which the offeror provided items/services similar in type and scope to that required under the proposed acquisition:
- (1) Name of Contracting Activity
 - (2) Contract Number
 - (3) Contract Type
 - (4) Type of work (short summary – 200 words or less)
 - (5) Name of Contracting Officer with current contact information (phone number, e-mail address)
 - (6) Name of Technical Point of Contact with current contact information (phone number, e-mail address)

Offerors' past performance will be evaluated for conformance to specifications; standards of good workmanship; history of containing and forecasting costs; adherence to contract schedule; history of reasonable and cooperative behavior; and commitment to providing quality service at fair and reasonable prices. In evaluating offerors under this factor, the Government is not limited to the information provided by the offeror and may obtain information from other sources, such as the CPARS system or small business office records.

Offerors will receive high ratings for good past performance and low ratings for poor past performance. Offerors lacking relevant past experience will receive a neutral rating for past performance.

- (d) Quality Assurance – The offeror should provide sufficient information to clearly demonstrate its capability to establish and maintain an acceptable inspection system and to develop satisfactory manufacturing plan and assembly test procedures.

Evaluation factors other than price, when combined, are significantly more important than price.